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Pacchetto Strutturale MIL07

Data Center CAMPUS di Siziano
Siziano (PV)

Documento: 4553_ES_V_EP_03 - Pacchetto Strutturale MIL07
17/11/2025

Il Tecnico
DBA

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20.11.2025 17:10:20
GMT+01:00

STACK INFRASTRUCTURES

Via Lombardia 1, Siziano, Milan, Italy

MIL07

CALCULATION REPORT

MIL07-DBA-XX-XX-CA-S-00001

07/11/2025

Status - S4 (Suitable for stage approval)

Project Number 13038001

Nome File: MIL07-DBA-XX-XX-CA-S-00001- Calculation report.docx

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Project:	MIL 07
Site Adress:	Via Lombardia 1, Siziano, Milan, Italy
Document Title:	CALCULATION REPORT
Document Code:	MIL07-DBA-XX-XX-CA-S-00001
File Name:	MIL07-DBA-XX-XX-CA-S-00001- Calculation report.docx
Revsion Date:	07/11/2025
Revision descritption:	P01
Purpose of Issue:	13038001
Edited by:	Ing. Giacomo Perino
Checked by:	Ing. Elvis Barattin
Approved by:	Ing. Diego Serafini

Revision History:

REV.	RED.	CONTR.	APP.	DATA	DESCRIZIONE
P01	GPE	EBA	DSE	07/11/2025	S4 – RIBA 3 Submittal

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1. ILLUSTRATIVE TECHNICAL REPORT

This report has been prepared in support of the design of the structures for the construction of a data center building located in Via Lombardia, Municipality of Siziano (PV). This report is related to the RIBA 3 plus design of the project.

1.1. Description of the building context and characteristics of the site

Below is an overview of the site under consideration, showing the surrounding context.

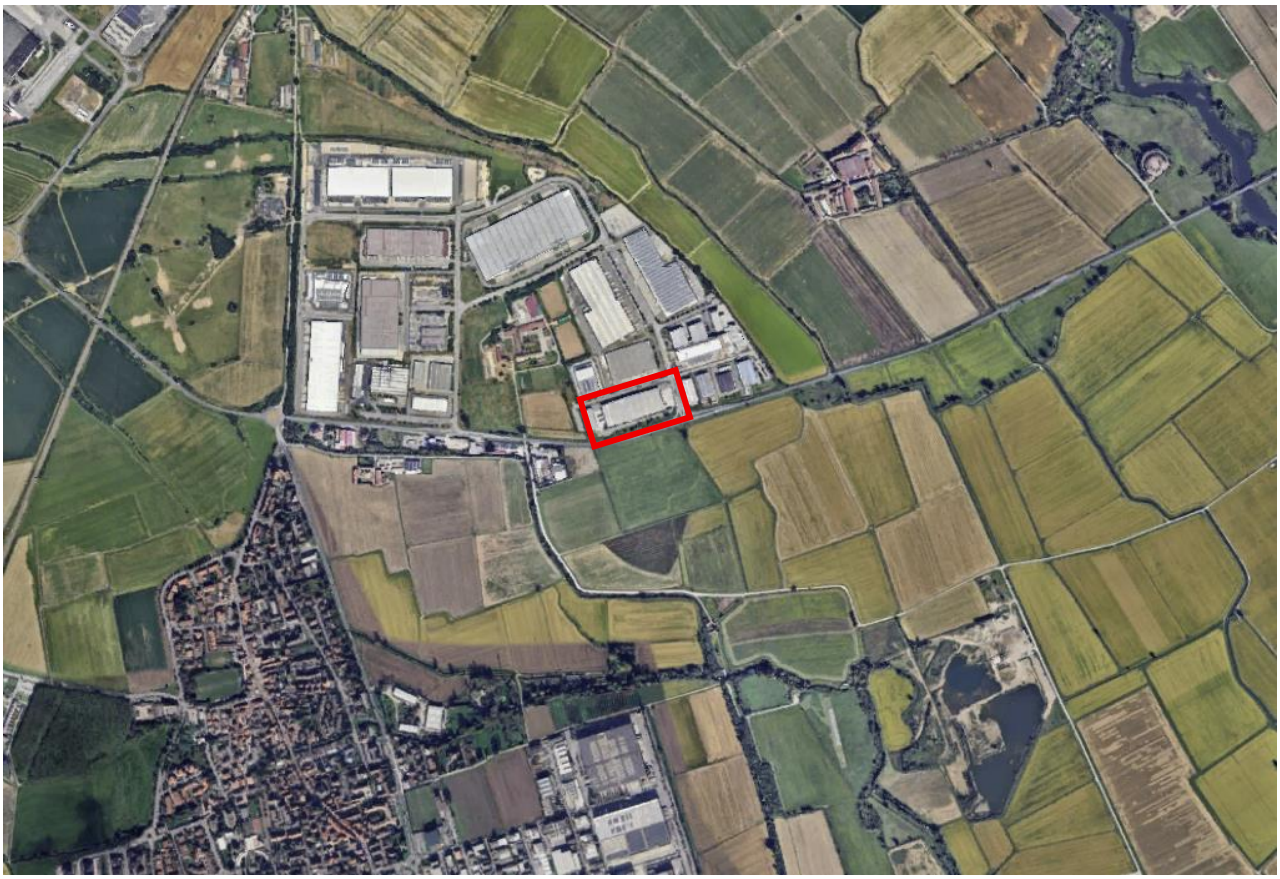

Figure 1: Photographic overview of the intervention site.

The area under consideration is located to the north-east of the Municipality of Siziano, within a flat territory characterised by a moderately urbanised context, at an elevation of approximately 93.0 m above sea level.

The site lies within an area lithologically characterised by *sand with silt and well-graded sandy gravel*.

Examination of the samples obtained from continuous boreholes, together with the cone penetration resistance profiles from in-situ penetrometric tests, has allowed to identy a sequence of overlapping lithostratigraphic layers. These layers exhibit distinct resistance to static penetration and specific lithological and geomechanical parameters.

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The results indicate a fairly homogeneous lithostratigraphic profile along the investigated boreholes. In particular, the soils consist mainly in sandy layers overlapped with silty layers.

The local lithostratigraphic model is proposed as follows:

Strato	Profondità [m]	Litologia
R	da 0.0 a 1,50-2,0	Materiali eterogenei di riporto
1	da 1,50-2,0 a 2,50-6,0	Limi sabbiosi
2	da 2,50-6,0 a 4,0-7,0	Sabbie limose
3	da 4,0-7,0 a 7,0-11,5	Argille limose/limi argillosi
4	da 7,0-11,5 a 25,0-29,0	Alternanze di sabbie con ciottoli e sabbie limose
5	> 25,0-29,0	Sabbie limose

Figure 2: Lithostratigraphic model.

The average geotechnical parameters of the soils in the area are shown below:

Strato	Profondità [m]	Litologia	γ [kN/m³]	c' [kPa]	cu [kPa]	ϕ' [°]	E' [Kg/cm²]	Eu [Kg/cm²]
R	da 0.0 a 1,50-2,0	Materiali eterogenei di riporto	-	-	-	-	-	-
1	da 1,50-2,0 a 2,50-6,0	Limi sabbiosi	18	20	-	27-28	90-110	-
2	da 2,50-6,0 a 4,0-7,0	Sabbie limose	18	-	-	33-34	140-180	-
3	da 4,0-7,0 a 7,0-11,5	Argille limose/limi argillosi	19	-	40	-	-	120-140
4	da 7,0-11,5 a 25,0-29,0	Alternanze di sabbie con ciottoli e sabbie limose	19	-	-	33-34	250-300	-
5	> 25,0-29,0	Sabbie limose	18	-	-	32-33	150-200	-

Figure 3: Geotechnical parameters.

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The water level was found at a depth of about -2.30 meters from the current ground level.

With reference to the seismic characteristics of the soil, from the analysis of the investigations carried out, the site is characterized by a **subsoil category "C"** and a **topographic category "T1".**

1.2. General description of the structure and the type of intervention

The project is about the construction of a new data centre building with a rectangular plan, having maximum overall dimensions of approximately 210.0 × 30.0 m and a maximum height above ground of about 12.50 m.

The building is divided into two distinct functional sections.

The first section is a single storey building, designated for data centre use, with a flat roof accommodating a central plant area. Above this area there is a platform for the installation of chiller units (the “chiller platform”), equipped with steel framing and acoustic screening panels. This section is subdivided into two buildings separated by a seismic joint.

The second section consists of two storeys building (ground and first floor) used as office space and facilities, with an accessible flat roof. The façades of the office building are provided with steel cladding elements, while the main entrance is sheltered by a steel portal frame. The office block is separated from the single-storey section by a seismic joint.

The project also includes an external area for generator units, enclosed by steel framing and acoustic panels.

The buildings are constructed with a load-bearing structure in both ordinary and prestressed reinforced concrete, composed of beams and columns arranged in two orthogonal directions. More specifically, the structures are in prefabricated reinforced concrete type, consisting of prestressed concrete beams connected to reinforced concrete columns and shear walls through hinged joints, with the columns embedded at their bases (as provided for in §7.4.5.1 of the NTC).

The roof of the single-storey section and the first-floor deck of the office building are made of 40 cm thick precast floor panels, completed with a 10 cm thick cast-in-place reinforced concrete topping slab.

The roof of the office building consists of 30 cm thick precast floor panels, also completed with a 10 cm thick reinforced concrete slab.

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The “Chiller Platform” consists main beams in prestressed concrete with an I-section 80 cm deep, and a secondary framework of steel beams with HEB360 and HEA160 profiles. Around the perimeter of the roof, steel framing and acoustic panels are provided, for a total height of 3.70 m. The steel enclosures around the external generator units reach a height of 9.0 m.

The foundation system consists of in-situ concrete footings combined with continuous flight auger (CFA) piles to control settlements, ensuring direct coupling for continuous structural connection with the superstructure columns.

The column connections consist in a composite system with corrugated sleeves and anchor bolts cast into the foundations, and shoes with ribbed reinforcement bars embedded in the precast elements. The joint between the precast vertical elements (columns and walls) and the foundation will be filled with compensated-shrinkage mortar such as “Exocem G1” or an equivalent product with similar performance characteristics.

1.3. Calculation and verification criteria

In accordance with § 7.4.3 of the Ministerial Decree 17/01/2018, seismic-resistant reinforced concrete structures can be classified according to one of the structural types provided for by the standards in § 7.4.3.1 with the addition of the structural types provided for in § 7.4.5.1 with reference to "*constructions with prefabricated structure".*

In this specific case, the structural scheme of the buildings can be classified among the *"constructions with a prefabricated structure",* referred to in § 7.4.5 of the NTC. More specifically, they can be classified as "*structures with columns embedded at the base and horizontally hinged to them",* consisting of normal and prestressed reinforced concrete beams connected by a hinge constraint to reinforced concrete columns embedded at the base.

For this type of structure, according to § 7.4.5.2.1 of the Ministerial Decree 17/01/2018, the rules relating to type "a" connections apply to elevation connections, while the rules relating to type "b" connections apply to the basic constraint of the columns, as the creation of a total joint with the foundation must be guaranteed. With reference to type "a" connections, it should be noted that the beam-column connection must be made outside the expected dissipative zones. This limitation is considered satisfied if the connection is positioned at a distance from the end of the element, beam or column, where there is a dissipative zone at least equal to the length of the section where the transversal containment reinforcement is planned (refinement of the stirrups in the critical area), increased by one time the useful height of the section. The resistance of the connection must also be not less than the local calculation stress. For single-storey structures, the shear strength of hinged connections must not be less than the horizontal force necessary to induce in the base section of the column a bending moment equal to the ultimate resisting moment, multiplied by an over-strength factor Y_{Rd} as per Table 7.2.I. For multi-

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storey structures, hinged connections must be dimensioned with respect to the floor force in equilibrium with the shear diagram resulting from the indications given in the "Columns" section of § 7.4.5.3. With reference to type "b" connections, it is also necessary to size the parts of the elements adjacent to the joints, oversizing them in such a way as to move the plasticization to adjacent areas located within the elements themselves (base of the columns); this requirement is considered satisfied by verifying the basic joints (consisting in the case in question of couplings to the foundation structures) with an adequate over-strength factor (γ_{Rd} = 1.2 for CD "B" structures; γ_{Rd} = 1.35 for CD "A" structures).

The calculation of the structures was performed with the limit state method, by means of *modal dynamic analysis without condensation of the floor* and of a certain behavior factor according to the provisions of the Italian legislation (Ministerial Decree 17/01/2018), through an automatic calculation procedure. As regards the seismic verification, reference is made to the Ministerial Decree 17/01/2018, while for the definition of the behaviour factor, reference is made to § 1.8 of this report.

The stresses due to the seismic action were calculated by *modal analysis with response spectrum*, using a model of the structure that represents the real planimetric and altimetric articulation taking into account a number of modes of vibration sufficient to excite more than 85% of the total mass of the structure as required by § 7.3.3.1 of the NTC. This analysis was carried out along two orthogonal directions, taking into account the following conditions, combined according to the requirements of the standards. The project was developed in medium ductility class (CD "B"). As regards the ultimate limit state strength checks, a sectional evaluation was carried out taking into account the non-linear behavior of the materials and the hierarchy of strengths introduced by *the Technical Standards for Construction*. The evaluation of the local stress states at the serviceability limit states was carried out by means of the "n" method assuming that the concrete is not able to exert any tensile strength and considering a homogenization coefficient between steel and concrete equal to 15. Through a linear dynamic analysis, the stresses in all the limit states under consideration (ultimate, damage and serviceability limit states) were evaluated.

The modeling of the structures was carried out taking into account, as described in § 7.2.6 of the Ministerial Decree 17/01/2018, the cracking of fragile materials. *If no specific analyses are carried out, the flexural and shear stiffness of masonry, reinforced concrete, steel-concrete elements can be reduced by up to 50% of the stiffness of the corresponding non-cracked elements, taking due account of the considered limit state and the influence of the permanent axial stress.*

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It should be noted that the calculation of the pillars was carried out by reducing the flexural efficiency of the section by about 40% (being compressed elements), in order to consider the effects of cracking ("*Thomas Paulay, M. J. N. Priestley - Seismic Design of Reinforced Concrete and Masonry Buildings.*"), while the calculation of the prestressed beams is carried out without reducing the flexural efficiency where the calculated element has a *total prestressing* of the section and considering, on the contrary, the cracked section when the tensile stresses are excessive so as to require the calculation in *partial prestressing.*

For the purposes of the schematization adopted in the calculation, the following are considered as constraints between the various structural elements:

PILLARS - ---------- FOUNDATION WINKLER GROUND INTERLOCKING

PILLARS - BEAMS ---------- HINGE

FLOORS - BEAMS ---------- HINGE

The sizing carried out takes into account the regulations for constructions in seismic areas referred to in Ministerial Decree 17/01/2018 and the variable overloads have been calculated for a height above sea level < 200 m.

The contractor of the prefabricated reinforced concrete structures must proceed with the construction of normal and prestressed concrete products in its plant and their assembly on site, in accordance with Regulation 305/2011/EU of the European Parliament and of the Council of 9 March 2011 (Construction Products Regulation - CPR), which requires that the *prefabricated concrete products for ribbed floor elements, for linear structural elements, for special roof elements, for floor slabs, for foundation elements, for wall elements, for stairs and for bridge elements*, products must be certified with the initials **XXX-CPR-XXX,** with particular reference to the requirements of the harmonized standards for individual prefabricated reinforced concrete elements.

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1.4. Reference technical standards

The sizing of the structure has been developed in compliance with the listed regulations:

Ministerial Decree 17/01/2018	-	Technical standards for constructions 2018;
Circular 21 January 2019, n° 7	-	Instructions for the application of the Update of the "New technical standards for construction" referred to in the Ministerial Decree of 17 January 2018;
UNI EN 1992-1-1:2005 Part 1-1	-	Eurocode 2 – Design of concrete structures: General rules – Structural design against fire;
UNI EN 13224:2012	-	Precast concrete products – Ribbed elements for slabs
UNI EN 13225:2013	-	Precast concrete products – Linear structural elements
UNI EN 14991:2007	-	Precast concrete products – Foundation elements
UNI EN 14992:2012	-	Precast concrete products – Wall elements

1.5. Nominal life and use class

In accordance with the provisions of § 2.4.1 of the NTC - D.M. 17/01/2018, *the nominal design life VN of a work is conventionally defined as the number of years in which the work, provided that it is subject to the necessary maintenance, is expected to maintain specific performance levels. The minimum values of VN to be adopted for the different types of construction are shown in Table 2.4.I.*

The construction falls under **Type 2** *"Constructions with ordinary performance levels"* for which a nominal life of years is expected $V_N \geq 50$.

The construction belongs to **Class IV:** "Buildings with important public or strategic functions, also with reference to the management of civil protection in the event of disasters. Industries with activities that are particularly dangerous for the environment [...]".

1.6. Definition of the basic seismic action

The calculation of the seismic action was carried out automatically, by solving a three-dimensional finite element model that allowed the development of a linear dynamic analysis without condensation of the floor displacement components (through the use of the Enexsys Winstrand program).

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The seismic action on buildings is evaluated starting from the "basic seismic hazard", in ideal conditions of a rigid reference site with a horizontal topographic surface.

The seismic hazard on the reference grid in the reference interval is provided by the data published on the website http://esse1.mi.ingv.it/. For points that do not coincide with the reference grid and return periods not directly contemplated, the procedure is as indicated in the annex to the NTC (weighted average and interpolation respectively).

Location of the structure	
Locality	Via Lombardia, Siziano
Common	SIZIANO
Province	Pavia
Region	LOMBARDY
Longitude	9.2133 E
Latitude	45.3258 N

The seismic action is defined in relation to a reference period V_r which is obtained, for each type of construction, by multiplying its nominal life by the coefficient of use (see table Structure parameters). Once the reference period V_r and the probability of exceedance P_{ver} associated with each of the limit states considered have been established, the return period T_r and the related seismic hazard parameters are obtained (see the following table):

Ag: maximum horizontal acceleration of the ground;

F0: maximum value of the amplification factor of the spectrum in horizontal acceleration;

T^*_c: period of initiation of the constant velocity section of the horizontal acceleration spectrum;

Structure parameters					
Use Class	Life Vn [years]	Coeff. Use	Vr Period [years]	Soil type	Topographic category
IV	50.0	2.0	100.0	C	T1

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Once the seismic hazard parameters have been identified on the reference grid, the spectral parameters shown in the table are evaluated.

S is the coefficient that takes into account the soil category and topographic conditions by means of the following relationship S = Ss*St;

F0 is the factor that quantifies the maximum spectral amplification, on a rigid horizontal reference site;

Fv is the factor that quantifies the maximum vertical spectral amplification, in terms of the maximum horizontal acceleration of the terrain ag on a horizontal rigid reference site;

Tb is the period corresponding to the beginning of the segment of the spectrum with constant acceleration;

Tc is the period corresponding to the beginning of the segment of the spectrum at constant velocity;

Td is the period corresponding to the beginning of the constant-shift stretch of the spectrum.

The parameters of the reference site for the Life Protection Limit State (SLV) and for the Damage Limit State (SLD) for the horizontal seismic action are shown below.

Spectrum in accordance with TU 2018

- Siziano PV Longitude 9.2011 Latitude 45.3219
- Type of Soil C
- Topographic Amplification Coefficient (ST) 1.0000
- Rated Building Life (VN) 50.0 years
- Use class IV coefficient CU 2.0
- Set ductility class Low
- Ductility factor αu/α1 for horizontal seismic 1.00
- Height regularity reduction factor KR 0.80
- Reductive factor for the presence of KW 1.00 septa

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TU 2018 SLV H

- Probability of Passing (PVR) 10.0 and Return Period (TR) 949 (years)
- SS 1,500
- TB 0.15 [sec]
- TC 0.46 [sec]
- TD 1.87 [sec]
- ag/d 0.0686
- Fo 2.6175
- TC* 0.2936

TU 2018 SLD H

- Probability of Passing (PVR) 63.0 and Return Period (TR) 101 (years)
- SS 1,500
- TB 0.13 [sec]
- TC 0.39 [sec]
- TD 1.74 [sec]
- ag/d 0.0339
- Fo 2.5698
- TC* 0.2280

TU 2018 SLO H

- Probability of Passing (PVR) 81.0 and Return Period (TR) 60 (years)
- SS 1,500
- TB 0.12 [sec]
- CT 0.36 [sec]
- TD 1.71 [sec]
- ag/d 0.0281
- Fo 2.5549
- TC* 0.2059

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1.7. Description of materials

The mechanical and durability characteristics of the materials considered are shown below:

1.7.1. In-situ reinforced concrete for foundations

Exposure class: XC2 Consistency class: S4 Inert Dmax: 31.5 mm

Resistance class: C25/30

Characteristic compressive strength of cube specimens: $R_{ck} = 300 daN / cm^2$

Characteristic strength of cylinder specimens: $f_{ck} = 0,83 \cdot R_{ck} = 249 daN / cm^2$

Design compressive strength: $f_{cd} = \alpha_{cc} \cdot f_{ck} / \gamma_c = 141,1 daN / cm^2$

Reduction factor for long-term effects: $\alpha_{cc} = 0,85$

Characteristic tensile strength: $f_{ctk} = 0,7 \cdot (0,3 \cdot f_{ck}{}^{2/3}) = 17,9 daN / cm^2$

Design tensile strength: $f_{ctd} = f_{ctk} / \gamma_c = 11,94 daN / cm^2$

Partial safety factor: $\gamma_c = 1,5$

Modulus of elasticity: $E = 314470 daN / cm^2$

Exposure class: *XC2*

Consistency class: *S4*

Maximum aggregate size: *31.5mm*

1.1.1 Concrete for precast structures

Columns, beams and floors

Exposure class: XC3 Consistency class: S4 Inert Dmax: 25 mm

Resistance class: C45/55

Characteristic compressive strength of cube specimens: $R_{ck} = 550 daN / cm^2$

Characteristic strength of cylinder specimens: $f_{ck} = 0,8182 \cdot R_{ck} = 450 daN / cm^2$

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Design compressive strength: $f_{cd} = \alpha_{cc} \cdot f_{ck} / \gamma_c = 255 daN / cm^2$

Reduction factor for long-term effects: $\alpha_{cc} = 0,85$

Characteristic tensile strength: $f_{ctk} = 0,7 \cdot (0,3 \cdot f_{ck}^{2/3}) = 26,6 daN / cm^2$

Design tensile strength: $f_{ctd} = f_{ctk} / \gamma_c = 16,37 daN / cm^2$

Partial safety factor: $\gamma_c = 1,5$

Modulus of elasticity: $E = 362832 daN / cm^2$

Infill panels

Exposure Class: XC4 Consistency class: S4 Inert Dmax: 25 mm

Resistance class: C32/40

Characteristic compressive strength of cube specimens: $R_{ck} = 400 daN / cm^2$

Characteristic strength of cylinder specimens: $f_{ck} = 0,8 \cdot R_{ck} = 320 daN / cm^2$

Design compressive strength: $f_{cd} = \alpha_{cc} \cdot f_{ck} / \gamma_c = 181,3 daN / cm^2$

Reduction factor for long-term effects: $\alpha_{cc} = 0,85$

Characteristic tensile strength: $f_{ctk} = 0,7 \cdot (0,3 \cdot f_{ck}^{2/3}) = 21,2 daN / cm^2$

Design tensile strength: $f_{ctd} = f_{ctk} / \gamma_c = 14,11 daN / cm^2$

Partial safety factor: $\gamma_c = 1,5$

Modulus of elasticity: $E = 333458 daN / cm^2$

1.7.2. Reinforcing steel – High adherence bars

Factory-produced B450C reinforcing steel

Ultimate tensile strength: $f_{tnom} \geq 5400 \ daN / cm^2$

Yield Strength: $f_{ynom} \geq 4500 \ daN / cm^2$

Design yield strength: $f_{yd} = f_{yk} / \gamma_s = 3913 \ daN / cm^2$

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Partial safety factor: $\gamma_s = 1{,}15$

Elongation at break: $A_{gt,k} = 7{,}5\%$

Modulus of elasticity: $E = 2100000\ daN/cm^2$

1.7.3. Stabilised strands for pre-tensioned and post-tensioned prestressing

Stabilised strands for pre-tensioning and post-tensioning

Nominal Strand Diameter 0.6": $\phi_{nom} = 15{,}2mm$

Nominal cross-sectional area: $A_{nom} = 1{,}39cm^2$

Characteristic tensile strength: $f_{tpk} = 18600daN/cm^2$

Characteristic strength at 1% total elongation: $f_{p(1)k} = 16700daN/cm^2$

Design strength at 1% total elongation: $f_{pd} = f_{p(1)k}/\gamma_s = 14521{,}7daN/cm^2$

Partial safety factor: $\gamma_s = 1{,}15$

Elongation at maximum load: $A_{gt} = 3{,}5\%$

Modulus of elasticity: $E = 2010000daN/cm^2$

1.7.4. Structural steelwork

Steel for open-section profiles

Grade S275 Steel

Execution class: EXC3 (UNI EN 1090-2:2011)

Characteristic Yield Strength: $f_{yk} = 2752\ N/mm^2$

Characteristic tensile strength: $f_{tk} = 4302\ N/mm^2$

Partial safety factors:

- For cross-section resistance: $\gamma_{M0} = 1{,}05$
- For member buckling resistance: $\gamma_{M1} = 1{,}05$
- For fracture resistance of tension members with holes: $\gamma_{M2} = 1{,}25$

Modulus of elasticity: $E = 210000\ N/mm^2$

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Structural steels in seismic areas must comply with the following requirements specified in §11.3.4.9 of the NTC - D.M. 17/01/2018:

Ratio between characteristic tensile and yield strength: $\frac{f_{tk}}{f_{yk}} > 1{,}10$

Elongation at break measured on standard specimen: $A5 > 20\%$

Average yield strength: $f_{y,media} < 1{,}20 \cdot f_{y,k}$

<u>Steel for tubular sections and plates</u>

Execution class: EXC3 (UNI EN 1090-2:2011)

Characteristic Yield Strength: $f_{yk} = 235\ N/mm^2$

Characteristic tensile strength: $f_{tk} = 360\ N/mm^2$

Partial safety factors:

- For cross-section resistance: $\gamma_{M0} = 1{,}05$
- For member buckling resistance: $\gamma_{M1} = 1{,}05$
- For fracture resistance of tension members with holes: $\gamma_{M2} = 1{,}25$

Modulus of elasticity: $E = 210000\ N/mm^2$

Structural steels in seismic areas must comply with the following requirements specified in §11.3.4.9 of the NTC - D.M. 17/01/2018:

Ratio between characteristic tensile and yield strength: $\frac{f_{tk}}{f_{yk}} > 1{,}10$

Elongation at break measured on standard specimen: $A5 > 20\%$

Average yield strength: $f_{y,media} < 1{,}20 \cdot f_{y,k}$

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1.7.5. Bolts and threaded rods

Strenght class: 8.8

Screw yield strength: $f_{yb} = 649\ N/mm^2$

Screw ultimate tensile strenght: $f_{tb} = 800\ N/mm^2$

Partial safety factor:

- Bolt Strength: $\gamma_{M2} = 1{,}25$

1.7.6. Cementitious mortar for wet joints

The pillar-foundation connections and between prefabricated elements involve the grouting of bars with improved adhesion in knurled pipes filled to saturation using cement mortar.

Caratteristiche tecniche

Diametro massimo inerte	3 mm
Acqua d'impasto per 100 kg di premiscelato secco	12,5 – 13,5 litri
Consistenza della malta (EN 13395-1)	250 +/- 20 mm
Peso specifico malta fresca (EN 1015-6)	2,10 +/- 0,05 g/cc
Volume di malta fresca per 100 kg di premiscelato secco	circa 54 litri
Resa (consumo di premiscelato secco)	circa 1,85 kg/m²/mm
Resa – Inghisaggio (consumo di premiscelato secco)	circa 1,85 kg/dm³
Espansione Contrastata 1 gg (UNI 8147)	>0,04%
Resistenza Compressione 1, 2, 7, 28 gg (EN 12190)	>40 >55 >70 >80 MPa
Resistenza Flessione 1, 2, 7, 28 gg (EN 196-1)	>4 >6 >7,5 >8 MPa
Modulo elastico- a 28 gg (EN 13412)	>33 GPa
Sfilamento a 28 gg (EN 1881)	Spostamento <0,6 mm al carico di 75 KN
Forza d'aderenza alla barra liscia a 28 gg- RILEM-CEB-FIP- RC6-78	>4 MPa
Forza d'aderenza alla barra aderenza migliorata a 28 gg -RILEM-CEB-FIP-RC6-78	25 MPa
Adesione al calcestruzzo a 28 gg - (EN 1542)	≥2 MPa
Reazione al fuoco (EN 13501-1)	Euroclasse A1

Before loading the column with any additional structural elements such as beams or slabs, the joint underneath the column base and the surrounding recesses must be prepared and filled in accordance with the mortar supplier's instructions.

To prevent air entrapment within the joint, it is recommended to pour the mortar from only one side of the column.

The formwork for grouting shall be arranged to ensure adequate concrete cover for both the column shoes and the anchor bolts.

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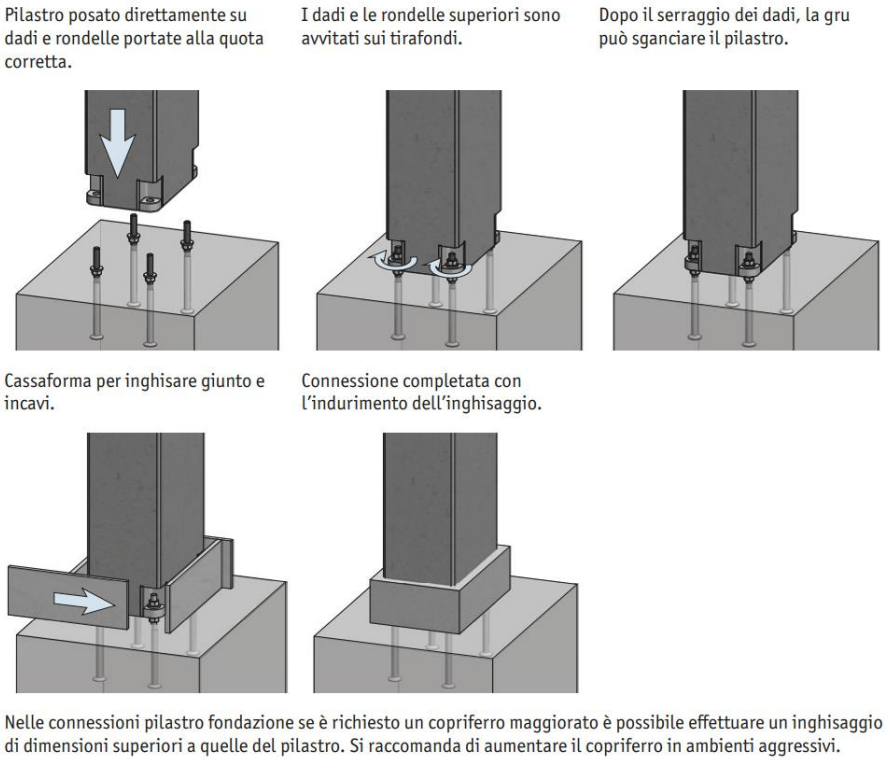
Once the grout has achieved sufficient strength, the connection is considered complete, and the other structural elements supported by the column may be installed.

For the erection of prefabricated columns and walls, the specifications provided by the manufacturer of the column shoe system shall be strictly followed.



1.8. Evaluation of the behavior factor, regularity and ductility classes

In accordance with § 7.2.2 of the Ministerial Decree 17/01/2018, *constructions subject to seismic action, not equipped with special isolation and/or dissipative devices, must be designed in accordance with one of the following structural behaviors:*

a) Non-dissipative structural behaviour

or

b) dissipative structural behavior.

For <u>non-dissipative structural behavior</u>, in the evaluation of the demand all the members and connections remain in the elastic or substantially elastic field, the demand deriving from the seismic action and other actions is calculated, according to the limit state to which reference is made, but regardless of the structural type and without taking into account the nonlinearities of the material, through an elastic pattern.

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Due to dissipative structural behaviour, in the evaluation of the demand a large number of members and/or connections evolve in the plastic field, while the remaining part of the structure remains in the elastic or substantially elastic field; the demand deriving from the seismic action and other actions is calculated, as a function of the limit state referred to and the structural type, taking into account the dissipative capacity linked to the nonlinearities of the material. If the dissipative capacity is implicitly taken into account through the behavior factor q, an elastic model is adopted; if the dissipative capacity is explicitly taken into account, an appropriate constitutive law is adopted.

In accordance with § 7.3.1 of the Ministerial Decree 17/01/2018, *linear analysis can be used to calculate the seismic demand in the case of both non-dissipative and dissipative structural behavior. In both cases, the seismic demand is calculated, whatever the modeling used for the seismic action, referring to the design spectrum obtained, for each limit state, assuming for the behavior factor q, the limits reported in Table 7.3.I with the values of the base factor q0 reported in Table 7.3.II.*

In the case of dissipative structural behavior, the value of the behavior factor q, to be used for the considered limit state and in the direction considered for the seismic action, depends on the structural type, its degree of hyperstaticity and the design criteria adopted and conventionally takes into account the dissipative capacity of the material. Structures can be classified as belonging to one type in one horizontal direction and to another type in the horizontal direction orthogonal to the previous one, using the corresponding behavior factor for each direction.

The upper limit q_{lim} of the behavioural factor for the SLV shall be calculated by the following:

$$q_{\lim} = q_0 \cdot K_R$$

where:

- q_0 *is the basic value of the SLV behaviour factor, the maximum values of which are shown in table 7.3.II depending on the Ductility Class, the structural type, the coefficient* λ *referred to in § 7.9.2.1 and the ratio* α_u / α_1 *between the value of the seismic action for which plasticisation occurs in a number of dissipative zones such as to make the structure a mechanism and the one for which the first structural element reaches the flexural plasticization; the choice of* q_0 *must be explicitly justified;*
- K_R *it is a factor that depends on the characteristics of regularity in height of the building, with a value of 1 for regular constructions in height and equal to 0.8 for constructions that are not regular in height.*

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For regular constructions in plan, if a non-linear analysis is not carried out for its evaluation, α_u / α_1 *the values indicated in the following paragraphs for the different types of construction can be adopted for the ratio. For non-regular constructions in plan, values* α_u / α_1 *equal to the average between 1.0 and the values provided from time to time for the different types of construction* can be adopted.

The value of q used for the vertical component of the seismic action at the SLV, unless adequate justifying analyses are carried out, is q=1.5 for any type of structure and material, except for bridges for which it is q=1.

For structures with non-dissipative structural behaviour, a behaviour factor is adopted q_{ND}*, reduced with respect to the minimum value relative to CD"B" according to the following:*

$$1 \le q_{ND} = \frac{2}{3} q_{CD"B"} \le 1,5$$

A construction with dissipative structural behavior must be designed to achieve one of two Ductility Classes (CD):

- High Ductility Class (CD"A"), with high dissipative capacity;

- Medium Ductility Class (CD"B"), with medium dissipative capacity.

The difference between the two classes lies in the extent of the plasticizations envisaged, in the design phase, both locally and globally.

Depending on the level of ductility to be achieved, both the methods of application of the hierarchies of the strengths and the extent of the seismic action of the design, regulated by the behavior factor q, vary. In this specific case, the calculations were carried out considering a medium ductility class (CD"B"), given the characteristics of the structures themselves.

The calculation of the seismic actions has been carried out with reference to the provisions of §7.4.5.1 of the Italian Building Code (NTC – Ministerial Decree 17/01/2018), applicable to "structures with a prefabricated system consisting of columns embedded at the base and beams hinged to them", designed in ductility class **CD "B"**.

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The structure consists of prestressed reinforced concrete beams connected by hinged joints to reinforced concrete columns fixed at their bases.

For such structures, Table 7.3.II of the above-mentioned Decree specifies a reference behaviour factor q_0 = 2.5, to be multiplied by the coefficient accounting for the structural regularity in elevation.

The structure under consideration does **not** satisfy the regularity requirements in plan and elevation defined in §7.2.1 of the Ministerial Decree 17/01/2018. It is, however, compliant with the provisions of §§7.4.5.2 and 7.4.5.3 concerning structural connections.

With regard to the connections, the rules for type “a” connections—as defined in §7.4.5.2.1 of the NTC—apply to this category of frames, which is typical of prefabricated construction systems.
Conversely, the column-to-foundation connection must ensure full fixity and is designed in accordance with the provisions for type “b” connections, also referred to in §7.4.5.2.1 of the NTC.

Based on the above considerations, the behaviour factor q for the building is determined as follows:

$$\boldsymbol{q = q_0 \cdot k_R = 2,5 \cdot 0,80 = 2,0}$$

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1.9. Load conditions and combinations

The calculation and the verification of strength and deformability have been carried out on the basis of the following load analysis:

Load analysis - Datacenter roof

"Delphi" type slab H = 40 cm + reinforced concrete topping slab h = 10 cm - (Cat. E+Snow)

a)	Self-weight of the floor	G1=270,00 daN/m^2
b)	Permanent load G1 (10 cm thick reinforced concrete slab)	G1=250,00 daN/m^2
c)	Additional Permanent load G2	G2=400,00 daN/m^2
d)	Variable load (Cat. E)	Qk=150,00 daN/m^2
e)	Variable load (Snow)	Qk=120,00 daN/m^2

Load Analysis Datacenter Coverage | Hallways

"Delphi" type slab H = 40 cm + reinforced concrete topping slab h = 10 cm - (Cat. E)

a)	Floor dead weight	G1=270,00 daN/m^2
b)	Permanent load G1 (10 cm thick reinforced concrete slab)	G1=250,00 daN/m^2
c)	Additional Permanent load G2	G2=300,00 daN/m^2
d)	Variable load (Cat. E)	Q_k=1.200,00 daN/m^2

Load Analysis "Chiller Platform" | Areas for maintenance

Metal carpentry deck - (Cat. E+Snow)

a)	Self-weight metal profiles	automatically computed
b)	Additional Permanent load G2	G2=200,00 daN/m^2
c)	Variable overloads (Cat. E)	Q_k=300,00 daN/m^2
d)	Variable load (Snow)	Q_k=120,00 daN/m^2

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Load Analysis "Chiller Platform" | Chillers Areas

Steel deck - (Cat. E+Snow)

a)	Self-weight metal profiles	automatically computed
b)	Additional Permanent load G2	G2=150,00 daN/m^2
c)	Variable overloads (Cat. E)	Q_k=500,00 daN/m^2
d)	Variable load (Snow)	Q_k=120,00 daN/m^2

Load analysis First floor Offices

"Delphi" type slab H = 40 cm + reinforced concrete topping slab h = 10 cm - (Cat. E)

a)	Floor dead weight	G1=270,00 daN/m^2
b)	Permanent load G1 (10 cm thick reinforced concrete slab)	G1=250,00 daN/m^2
c)	Additional Permanent load G2	G2=450,00 daN/m^2
d)	Variable load (Cat. E)	Q_k=1.200,00 daN/m^2

Load analysis Office roof

"Delphi" type slab H = 30 cm + reinforced concrete topping slab h = 10 cm - (Cat. E+Snow)

a)	Floor dead weight	G1=240,00 daN/m^2
b)	Permanent load G1 (10 cm thick reinforced concrete slab)	G1=250,00 daN/m^2
c)	Additional Permanent load G2	G2=450,00 daN/m^2
d)	Variable overloads (Cat. E)	Q_k=150,00 daN/m^2
e)	Variable load (Snow)	Q_k=120,00 daN/m^2

The prefabricated infill panels has also been taken into account, with a representative load of 400.00 daN/m², in terms of weight and contribution to the seismic mass.

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1.9.1. Snow action

The calculation of the action of the snow acting on the structures is shown below.

<u>Snow for roofs</u>:

Location: Siziano

Municipality: Siziano

Province: Pavia

Region: LOMBARDY

Altitude a.s.l.: 93 m < 200 m

Reference legislation:

Ministerial Decree of 17 January 2018 - TECHNICAL STANDARDS FOR CONSTRUCTIONS Chap. 3 - ACTIONS ON CONSTRUCTIONS - Par. 3.4

Snow Zone = I Mediterranean

Ce (wind exposure coefficient) = 1.00

Characteristic value of the ground load (qsk Ce) = 150 daN/sqm

<u>Flat roofs:</u>

Pitch angle = <10°

$\mu 1(\alpha 1) = 0.80$

qSd = 120 daN/m²

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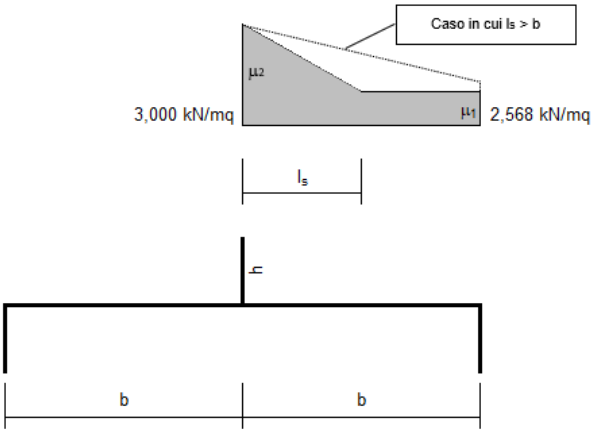
Snow accumulation on façade parapets and entrance portal screens:

b [m]	1,2
h [m]	2,1

l_s [m]	5
μ_1	0,8

$\gamma h/q_{sk}$	2,800
μ_2	2,000

$(0,8 \leq \mu_2 \leq 2,0)$



A snow load varying from 300 daN/m² to 260 daN/m² has been applied to the parapet screens located along the façades of the office building and on the entrance portal.

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1.9.2. Wind action

The calculation of the wind action, except for the pressure coefficient c_p, is conducted in accordance with § 3.3 of the Ministerial Decree 17/01/2018, with the help of a spreadsheet:

1) Valle d'Aosta, Piemonte, Lombardia, Trentino Alto Adige, Veneto, Friuli Venezia Giulia (con l'eccezione della provincia di Trieste)

Zona	$v_{b,0}$ [m/s]	a_0 [m]	k_a [1/s]
1	25	1000	0,01
a_s (altitudine sul livello del mare [m])			93
T_R (Tempo di ritorno)			50
$v_b = v_{b,0}$ per $a_s \le a_0$ $v_b = v_{b,0} + k_a (a_s - a_0)$ per $a_0 < a_s \le 1500$ m			
v_b (T_R = 50 [m/s])			25,000
α_R (T_R)			1,00073
v_b (T_R) = $v_b \times \alpha_R$ [m/s])			25,018

p (pressione del vento [N/mq]) = $q_b \cdot c_e \cdot c_p \cdot c_d$

q_b (pressione cinetica di riferimento [N/mq])

c_e (coefficiente di esposizione)

c_p (coefficiente di forma)

c_d (coefficiente dinamico)

Pressione cinetica di riferimento

$q_b = 1/2 \cdot \rho \cdot v_b^2$ (ρ = 1,25 kg/mc)

q_b [N/mq]	391,20

Coefficiente di forma

E' il coefficiente di forma (o coefficiente aerodinamico), funzione della tipologia e della geometria della costruzione e del suo orientamento rispetto alla direzione del vento. Il suo valore può essere ricavato da dati suffragati da opportuna documentazione o da prove sperimentali in galleria del vento.

Coefficiente dinamico

Esso può essere assunto autelativamente pari ad 1 nelle costruzioni di tipologia ricorrente, quali gli edifici di forma regolare non eccedenti 80 m di altezza ed i capannoni industriali, oppure può essere determinato mediante analisi specifiche o facendo riferimento a dati di comprovata affidabilità.

Coefficiente di esposizione

Classe di rugosità del terreno

C) Aree con ostacoli diffusi (alberi, case, muri, recinzioni,....); aree con rugosità non riconducibile alle classi A, B, D

Categoria di esposizione

ZONE 1,2,3,4,5

A	- -	IV	IV	V	V	V
B	- -	III	III	IV	IV	IV
C	- -	*	III	III	IV	IV
D	I	II	II	II	III	**

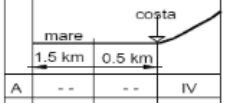
* Categoria II in zona 1,2,3,4
Categoria III in zona 5

** Categoria III in zona 2,3,4,5
Categoria IV in zona 1

ZONA 6

A	- -	III	IV	V	V
B	- -	II	III	IV	IV
C	- -	II	III	III	IV
D	I	I	II	II	III

ZONE 7,8



A	- -	- -	IV
B	- -	- -	IV
C	- -	- -	III
D	I	II	*

* Categoria II in zona 8
Categoria III in zona 7

ZONA 9

A	- -	I
B	- -	I
C	- -	I
D	I	I

Zona	Classe di rugosità	a_s [m]
1	C	93

$c_e(z) = k_r^2 \cdot c_t \cdot \ln(z/z_0)\,[7 + c_t \cdot \ln(z/z_0)]$ per $z \ge z_{min}$

$c_e(z) = c_e(z_{min})$ per $z < z_{min}$

Cat. Esposiz.	k_r	z_0 [m]	z_{min} [m]	c_t
III	0,2	0,1	5	1

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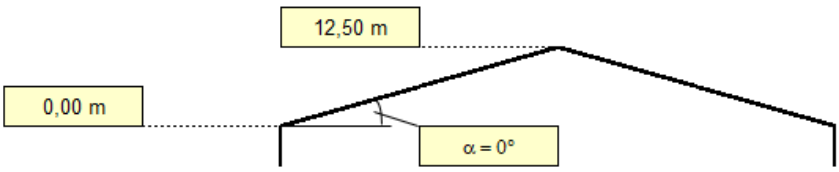
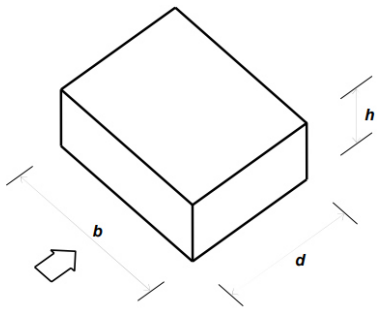
Wind action on the main building

z [m]	c_e
z ≤ 5	1,708
z = 0	1,708
z = 12,5	2,284



The wind pressure, less the shape coefficient, is equal to **893.5 N/sqm (89.3 daN/sqm).**

The calculation of the global aerodynamic pressure coefficients C_{pe} is carried out according to the provisions of § C3.3.8.1.1 of Circular no. 7 of 21/01/2019 and using the formulations shown in table C3.3.I:



Parametri caratteristici di edifici a pianta rettangolare.

Faccia sopravento	$C_U = 2,0$	$C_U = 1,5$
h/d ≤ 1: c_{pe}= 0,7 + 0,1·h/d	h/d ≤ 0,5: c_{pe}= -0,5 - -0,8·h/d	h/d ≤ 1: c_{pe}= -0,3 - 0,2·h/d
h/d > 1: c_{pe}= 0,8	h/d > 0,5: c_{pe}= -0,9	1 < h/d ≤ 5: c_{pe}= -0,5 -0,05·(h/d-1)

The calculation of the global aerodynamic pressure coefficients C_{pe} is shown below:

For the sake of simplicity and safety, by adopting the same ratio **h/d = 0.41** for both wind directions, the following external pressure coefficients and corresponding wind pressures have been obtained:

Windward condition: CPE = +0.741 → **p = +65 daN/sqm**;

Leeward condition: CPE = - 0.382 → **p = -34 daN/sqm**.

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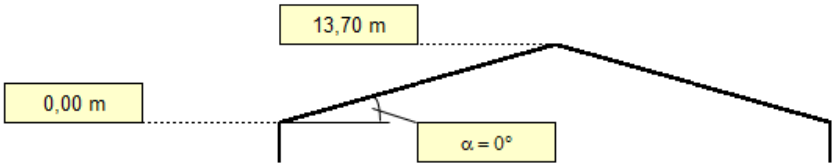
The internal pressures were assessed in accordance with Case 3 of § C3.3.8.5 of Circular no. 7 of 21/01/2019:

Positive pressures: cpi = + 0.20 → **p = +18 daN/sqm**;

Negative pressures: CPE = - 0.30 → **p = -26 daN/sqm**.

Wind Action on the "Chiller Platform" Screening Structure

z [m]	c_e
z ≤ 5	1,708
z = 0	1,708
z = 13,7	2,346



The basic wind pressure, before applying the shape coefficient, is equal to **918.0 N/sqm (91.8 daN/sqm).**

The calculation of the aerodynamic pressure coefficient C_{pe} has been carried out in accordance with § G.5 of CNR-DT 207/2008, Table G.X.

Tabella G.X – Coefficienti di pressione complessiva per muri e parapetti.

φ	Chiusura laterale	*l/h*	A	B	C	D
1,0	no	<3	2,3	1,4	1,2	1,2
		5	2,9	1,8	1,4	
		>10	3,4	2,1	1,7	
	si	tutti	2,1	1,8	1,4	
0,8	si/no	tutti	1,2			

- Section A: L.=1.10 m → c_p=2.1 → p=193.0 daN/m^2
- Section B: L.=6.30 m → c_p=1.8 → p=165.0 daN/m^2
- Section C: L.=7.40 m → c_p=1.4 → p=129.0 daN/m^2
- Section D: L.=Var. m → c_p=1.2 → p=110.0 daN/m^2

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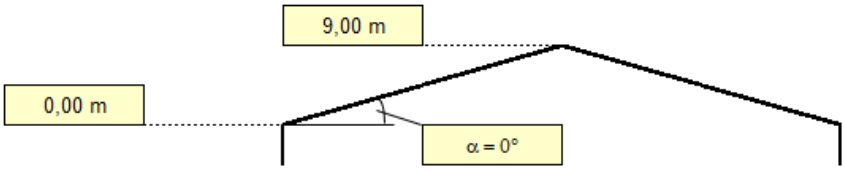
Wind Action on the "GE Area" Screening Structure

z [m]	c_e
z ≤ 5	1,708
z = 0	1,708
z = 9	2,070



The basic wind pressure, before applying the shape coefficient, is equal to **810.0 N/sqm (81.0 daN/sqm).**

The calculation of the aerodynamic pressure coefficient C_{pe} has been carried out in accordance with § G.5 of CNR-DT 207/2008, Table G.X.

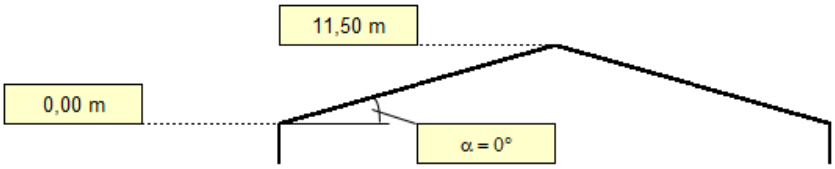
Tabella G.X – Coefficienti di pressione complessiva per muri e parapetti.

φ	Chiusura laterale	*l/h*	A	B	C	D
1,0	no	<3	2,3	1,4	1,2	1,2
		5	2,9	1,8	1,4	
		>10	3,4	2,1	1,7	
	si	tutti	2,1	1,8	1,4	
0,8	si/no	tutti	1,2			

- Section A: L.=2.70 m → c_p=2.1 → p=170.0 daN/m^2
- Section B: L.=5.10 m → c_p=1.8 → p=138.0 daN/m^2
- Section C: L.=6.0 m → c_p=1.4 → p=113.0 daN/m^2
- Section D: L.=Var. m → c_p=1.2 → p=97.0 daN/m^2

Wind Action on the Office Façade Screening Panels

z [m]	c_e
z ≤ 5	1,708
z = 0	1,708
z = 11,5	2,229



The basic wind pressure, before applying the shape coefficient, is equal to **872.0 N/sqm (87.2 daN/sqm).**

The calculation of the aerodynamic pressure coefficient C_{pe} is carried out according to what is reported in Table C3.3.II of the C.S.LL.PP. Circular 21/01/2019 n.7:

$$CPE,10 = 1.2 \rightarrow P=105\ kg/m^2$$

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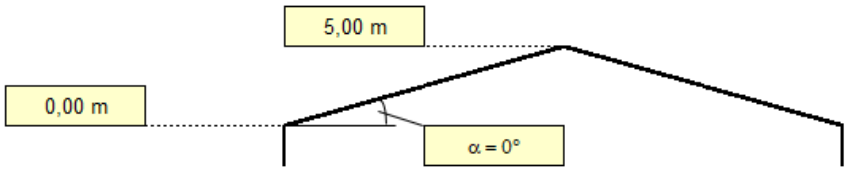
Wind action on the office entrance portal

z [m]	c_e
z ≤ 5	1,708
z = 0	1,708
z = 5	1,708



The basic wind pressure, before applying the shape coefficient, is equal to **668.2 N/sqm (66.8 daN/sqm).**

The calculation of the aerodynamic pressure coefficient C_{pe} is carried out according to § C3.3.8.2.1 of the C.S.LL.PP. Circular 21/01/2019 n.7:

$$CPE = 1.4 \rightarrow p=93.5\ kg/m^2$$

1.9.3. Seismic action

The response spectra for the Life-Saving Limit State (evaluated with the behavioural factor q defined above), for the Damage Limit State and for the Operational Limit State are reported below.

It should be noted that, in accordance with § 7.2.2 of the NTC, the effects of the vertical component of the seismic action for the prestressed elements have been taken into account through partial calculation models.

Life Saving Limit State (horizontal SLV)

- Probability of Passing (PVR) 10.0 and Return Period (TR) 949 (years)
- SS 1,500
- TB 0.15 [sec]
- TC 0.46 [sec]
- TD 1.87 [sec]
- ag/d 0.0686
- Fo 2.6175
- TC* 0.2936

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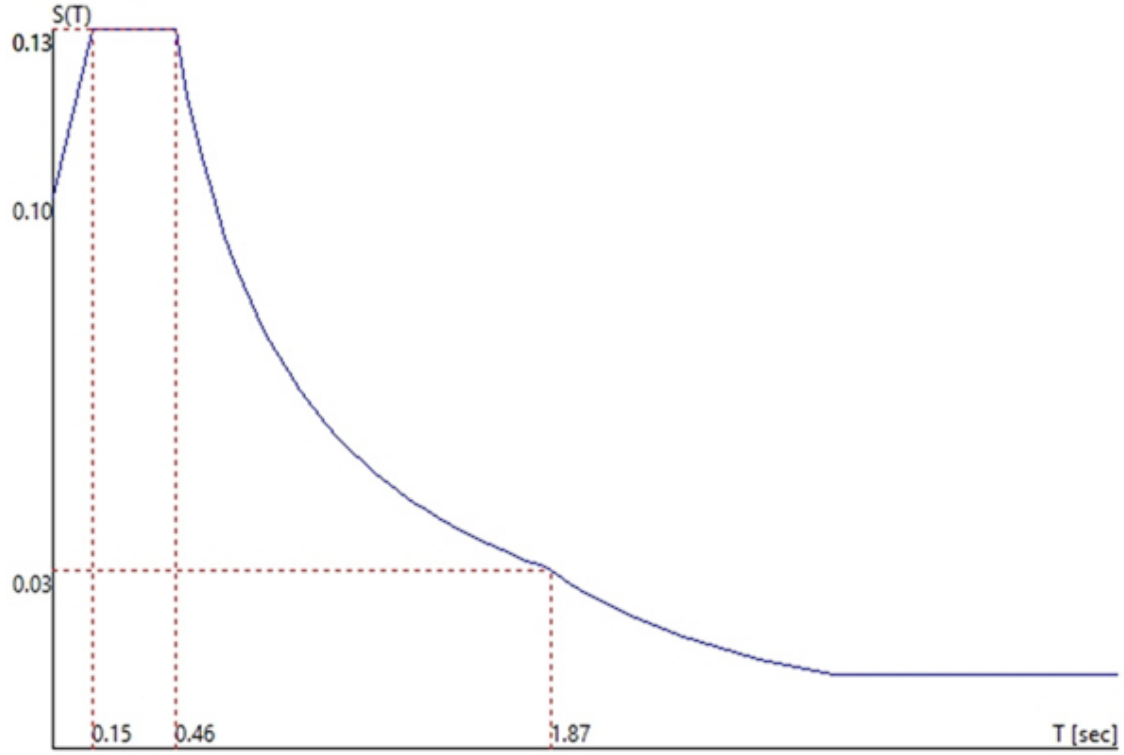

Figure 4: Response spectrum relative to SLV H (TU 2018) – q=2.0.

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Damage Limit State (horizontal SLD)

- Probability of Passing (PVR) 63.0 and Return Period (TR) 101 (years)
- SS 1,500
- TB 0.13 [sec]
- TC 0.39 [sec]
- TD 1.74 [sec]
- ag/d 0.0339
- Fo 2.5698
- TC* 0.2280

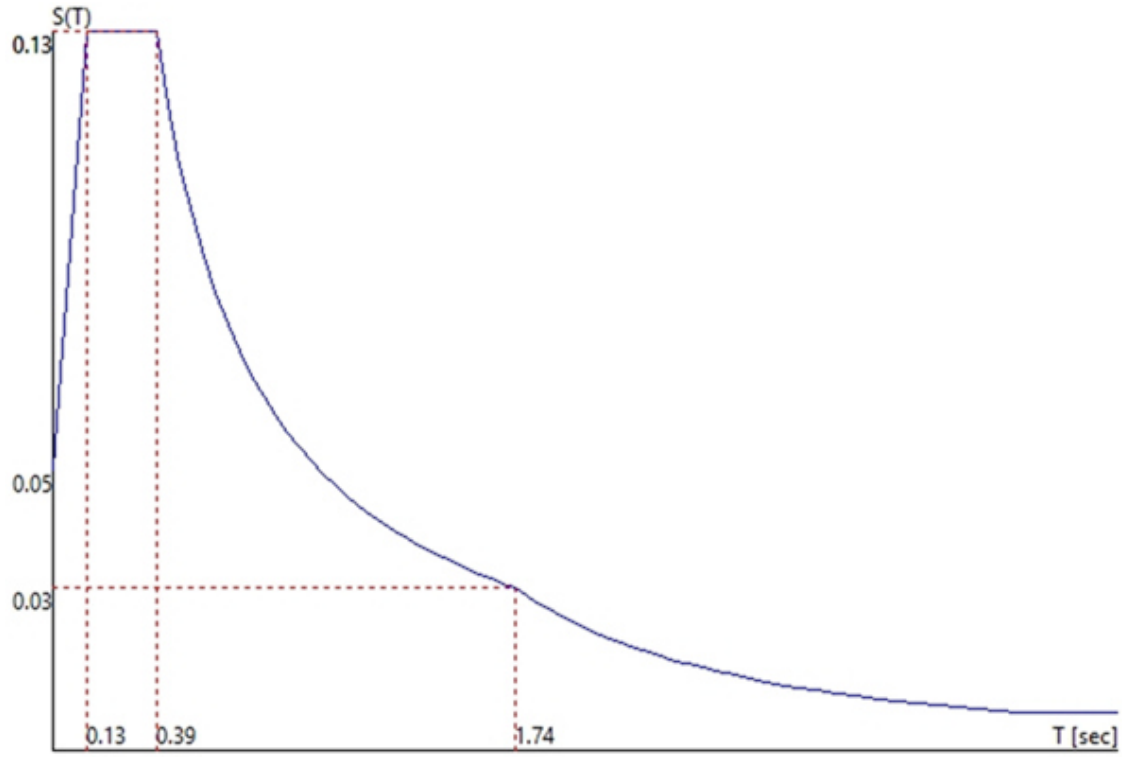

Figure 5: Response spectrum relative to SLD H (TU 2018).

Operating Limit State (horizontal SLO)

- Probability of Passing (PVR) 81.0 and Return Period (TR) 60 (years)
- SS 1,500
- TB 0.12 [sec]
- CT 0.36 [sec]
- TD 1.71 [sec]
- ag/d 0.0281
- Fo 2.5549
- TC* 0.2059

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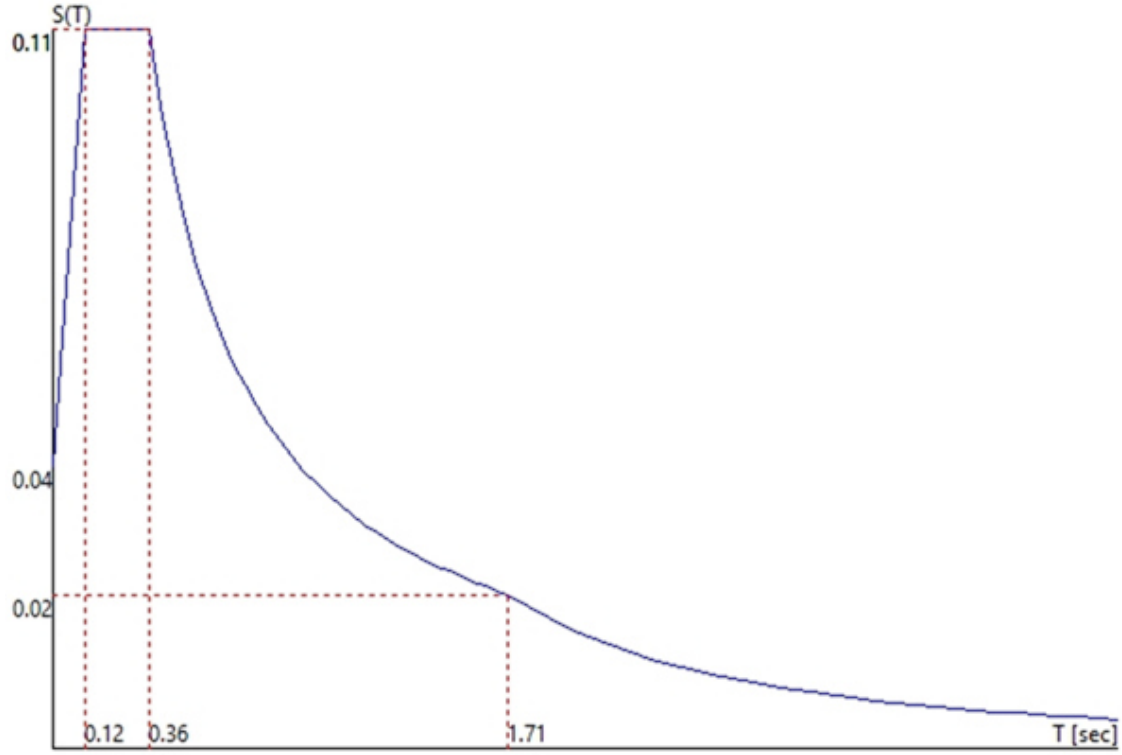

Figure 6: Response spectrum relative to SLO H (TU 2018).

1.9.4. Load conditions and combinations

<u>Loading conditions</u>

The expected load conditions include, with reference to the factor of participation in the seismic action:

1) Self-weight - *Participation factor = 1;*
2) Permanent load G1 - *Participation factor = 1;*
3) Additional permanent load G2 - *Participation factor = 1;*
4) Variable load (Cat.E) - *Participation factor = 0.8;*
5) Variable loads(Snow) - *Participation factor = 0.0;*
6) Additional loads (to take into account the static loads of the infill on the foundations) - *Participation factor = 0.0;*
7) Additional masses (to take into account the masses of the infills, which also do not weigh on the columns) - *Participation factor = 1;*
8) Variable load (Wind +X) - *Participation factor = 0;*
9) Variable load (Wind -X) - *Participation factor = 0;*
10) Variable load (Wind +Y) - *Participation factor = 0;*

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11) Variable load (Wind -Y) - *Participation factor = 0;*

12)-19) SLV seismic conditions;

20)-27) SLD seismic conditions;

28)-35) Seismic conditions SLO.

Defined load conditions:

Condition	
1	Own weight
2	G1 Permanent Bearings
3	G2 Permanent Masks
4	Cat.E variables
5	Snow Variables
6	Weight infill
7	Mass infills
8	Wind +X
9	Wind -X
10	Wind +Y
11	Wind -Y
12	Earthquake 0+
13	Earthquake 0-
14	Earthquake 90+
15	Earthquake 90-
16	Earthquake 180+
17	Earthquake 180-
18	Earthquake 270+
19	Earthquake 270-
20	Earthquake 0+
21	Earthquake 0-
22	Earthquake 90+
23	Earthquake 90-

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Condition

24	Earthquake 180+
25	Earthquake 180-
26	Earthquake 270+
27	Earthquake 270-
28	Earthquake 0+
29	Earthquake 0-
30	Earthquake 90+
31	Earthquake 90-
32	Earthquake 180+
33	Earthquake 180-
34	Earthquake 270+
35	Earthquake 270-

Ultimate Limit State Combinations

Load Combination Number

1	Variable SLU Cat.E
2	SLU Snow Variables
3	SLU Wind +X
4	SLU Wind -X
5	SLU Vento +Y
6	SLU Wind -Y

Comb.\Cond	1	2	3	4	5	6	8	9	10	11
1	1.3	1.3	1.5	1.5	0.75	1.3				
2	1.3	1.3	1.5	1.5	1.5	1.3				
3	1.3	1.3	1.5	1.5	0.75	1.3	1.5			
4	1.3	1.3	1.5	1.5	0.75	1.3		1.5		
5	1.3	1.3	1.5	1.5	0.75	1.3			1.5	
6	1.3	1.3	1.5	1.5	0.75	1.3				1.5

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Life-Saving Limit State Combinations

Load Combination Number	
7	SLV 0+ / 90+
8	SLV 0+ / 270+
9	SLV 0- / 90-
10	SLV 0- / 270-
11	SLV 90+ / 0+
12	SLV 90+ / 180+
13	SLV 90- / 0-
14	SLV 90- / 180-
15	SLV 180+ / 90+
16	SLV 180+ / 270+
17	SLV 180- / 90-
18	SLV 180- / 270-
19	SLV 270+ / 0+
20	SLV 270+ / 180+
21	SLV 270- / 0-
22	SLV 270- / 180-

Comb.\Cond	1	2	3	4	6	12	13	14	15	16	17	18	19
7	1	1	1	0.8	1	1		0.3					
8	1	1	1	0.8	1	1						0.3	
9	1	1	1	0.8	1		1		0.3				
10	1	1	1	0.8	1		1						0.3
11	1	1	1	0.8	1	0.3		1					
12	1	1	1	0.8	1			1		0.3			
13	1	1	1	0.8	1		0.3		1				
14	1	1	1	0.8	1				1		0.3		
15	1	1	1	0.8	1			0.3		1			
16	1	1	1	0.8	1					1		0.3	
17	1	1	1	0.8	1				0.3		1		

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18	1	1	1	0.8	1						1		0.3
19	1	1	1	0.8	1	0.3						1	
20	1	1	1	0.8	1					0.3		1	
21	1	1	1	0.8	1		0.3						1
22	1	1	1	0.8	1						0.3		1

RARE Combinations Serviceability Limit States

Load Combination Number

23	Rare Cat.E Variables
24	Rare Snow Variables
25	Rare Wind +X
26	Rare Wind -X
27	Rare Wind +Y
28	Rare Wind -Y

Comb.\Cond	1	2	3	4	5	6	8	9	10	11
23	1	1	1	1	0.5	1				
24	1	1	1	1	1	1				
25	1	1	1	1	0.5	1	1			
26	1	1	1	1	0.5	1		1		
27	1	1	1	1	0.5	1			1	
28	1	1	1	1	0.5	1				1

FREQUENT Combinations Serviceability Limit States

Load Combination Number

29	Variable Freq Cat.E
30	Variable Snow Freq
31	Freq Wind +X
32	Freq Wind -X
33	Freq Wind +Y

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Load Combination Number

34	Freq Wind -Y

Comb.\Cond	1	2	3	4	5	6	8	9	10	11
29	1	1	1	0.9		1				
30	1	1	1	0.8	0.2	1				
31	1	1	1	0.8		1	0.2			
32	1	1	1	0.8		1		0.2		
33	1	1	1	0.8		1			0.2	
34	1	1	1	0.8		1				0.2

QUASI-PERMANENT Serviceability Limit State Combinations

Load Combination Number

35	Q.P. Almost permanent

Comb.\Cond	1	2	3	4	6
35	1	1	1	0.8	1

Damage Limit State Combinations

Load Combination Number

36	SLD 0+ / 90+
37	SLD 0+ / 270+
38	SLD 0- / 90-
39	SLD 0- / 270-
40	SLD 90+ / 0+
41	SLD 90+ / 180+
42	SLD 90- / 0-
43	SLD 90- / 180-
44	SLD 180+ / 90+

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Load Combination Number	
45	SLD 180+ / 270+
46	SLD 180- / 90-
47	SLD 180- / 270-
48	SLD 270+ / 0+
49	SLD 270+ / 180+
50	SLD 270- / 0-
51	SLD 270- / 180-

Comb.\Cond	1	2	3	4	6	20	21	22	23	24	25	26	27
36	1	1	1	0.8	1	1		0.3					
37	1	1	1	0.8	1	1						0.3	
38	1	1	1	0.8	1		1		0.3				
39	1	1	1	0.8	1		1						0.3
40	1	1	1	0.8	1	0.3		1					
41	1	1	1	0.8	1			1		0.3			
42	1	1	1	0.8	1		0.3		1				
43	1	1	1	0.8	1				1		0.3		
44	1	1	1	0.8	1			0.3		1			
45	1	1	1	0.8	1					1		0.3	
46	1	1	1	0.8	1				0.3		1		
47	1	1	1	0.8	1						1		0.3
48	1	1	1	0.8	1	0.3						1	
49	1	1	1	0.8	1					0.3		1	
50	1	1	1	0.8	1		0.3						1
51	1	1	1	0.8	1						0.3		1

Combinations to the Operational Limit States

Load Combination Number	
52	SLO 0+ / 90+
53	SLO 0+ / 270+

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Load Combination Number

54	SLO 0- / 90-
55	SLO 0- / 270-
56	SLO 90+ / 0+
57	SLO 90+ / 180+
58	SLO 90- / 0-
59	SLO 90- / 180-
60	SLO 180+ / 90+
61	SLO 180+ / 270+
62	SLO 180- / 90-
63	SLO 180- / 270-
64	SLO 270+ / 0+
65	SLO 270+ / 180+
66	SLO 270- / 0-
67	SLO 270- / 180-

Comb.\Cond	1	2	3	4	6	28	29	30	31	32	33	34	35
52	1	1	1	0.8	1	1		0.3					
53	1	1	1	0.8	1	1						0.3	
54	1	1	1	0.8	1		1		0.3				
55	1	1	1	0.8	1		1						0.3
56	1	1	1	0.8	1	0.3		1					
57	1	1	1	0.8	1			1		0.3			
58	1	1	1	0.8	1		0.3		1				
59	1	1	1	0.8	1				1		0.3		
60	1	1	1	0.8	1			0.3		1			
61	1	1	1	0.8	1					1		0.3	
62	1	1	1	0.8	1				0.3		1		
63	1	1	1	0.8	1						1		0.3
64	1	1	1	0.8	1	0.3						1	
65	1	1	1	0.8	1					0.3		1	
66	1	1	1	0.8	1		0.3						1
67	1	1	1	0.8	1						0.3		1

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2. STRUCTURAL CALCULATION REPORT

2.1. Structure Modeling and Analysis Results

The calculation code adopted is Enexsys Winstrand produced by En.Ex.Sys. s.r.l. of Casalecchio di Reno (BO) with license no. 8846PRZZNT. For the characteristics of the software and details on the modelling of the structures, please refer to the following points in this report.

As required by §10.2 of the Ministerial Decree of 17/01/2018, it should be noted that the reliability of the calculation program has been verified by the designer through tests and rough comparisons, for which reference is made to the rest of this report. It can therefore be said that this code provides correct and congruent results.

The following figures illustrate the three-dimensional finite element model developed by computer, together with the static schemes and the principal deformation and stress states of the structural elements. It should be noted that a single calculation model was developed, encompassing all the buildings included in the project, in order to correctly assess the actions transmitted to the foundation structures.

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2.1.1. Main building

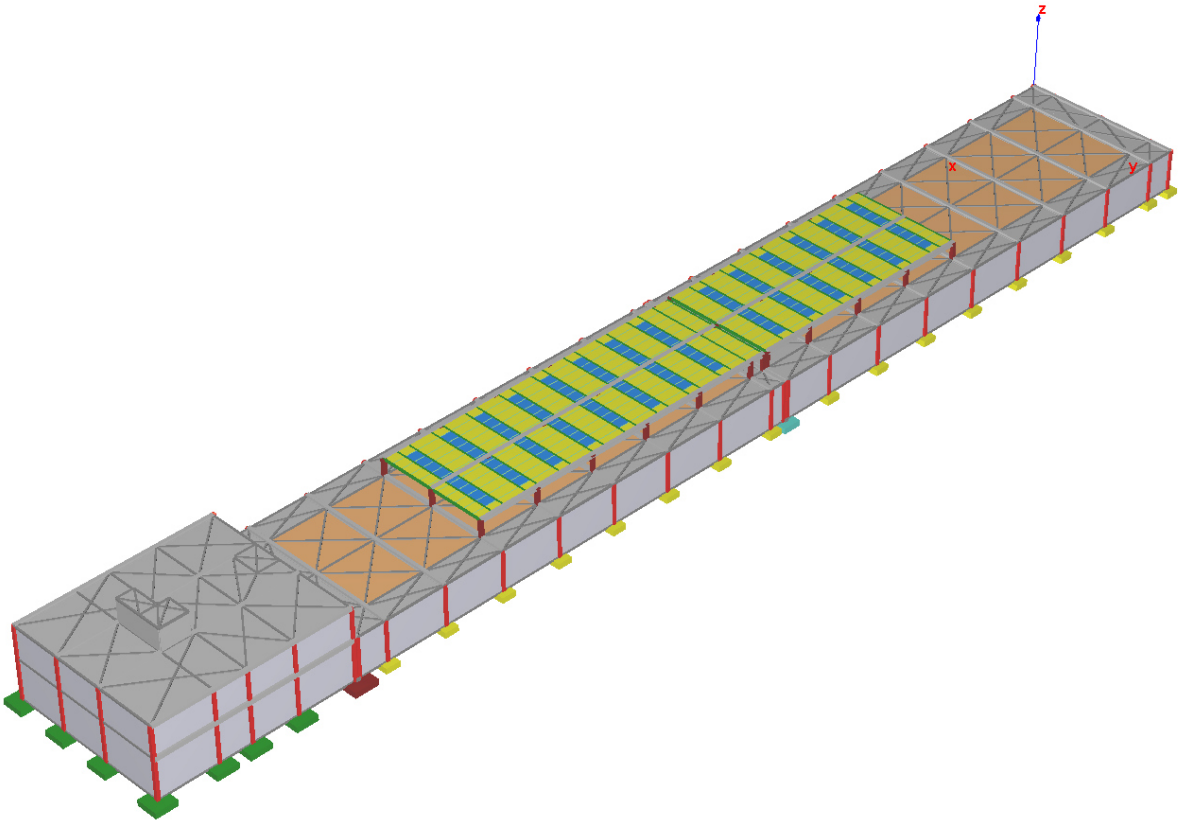

Figure 7: Three-dimensional finite element model (Solid View 1).

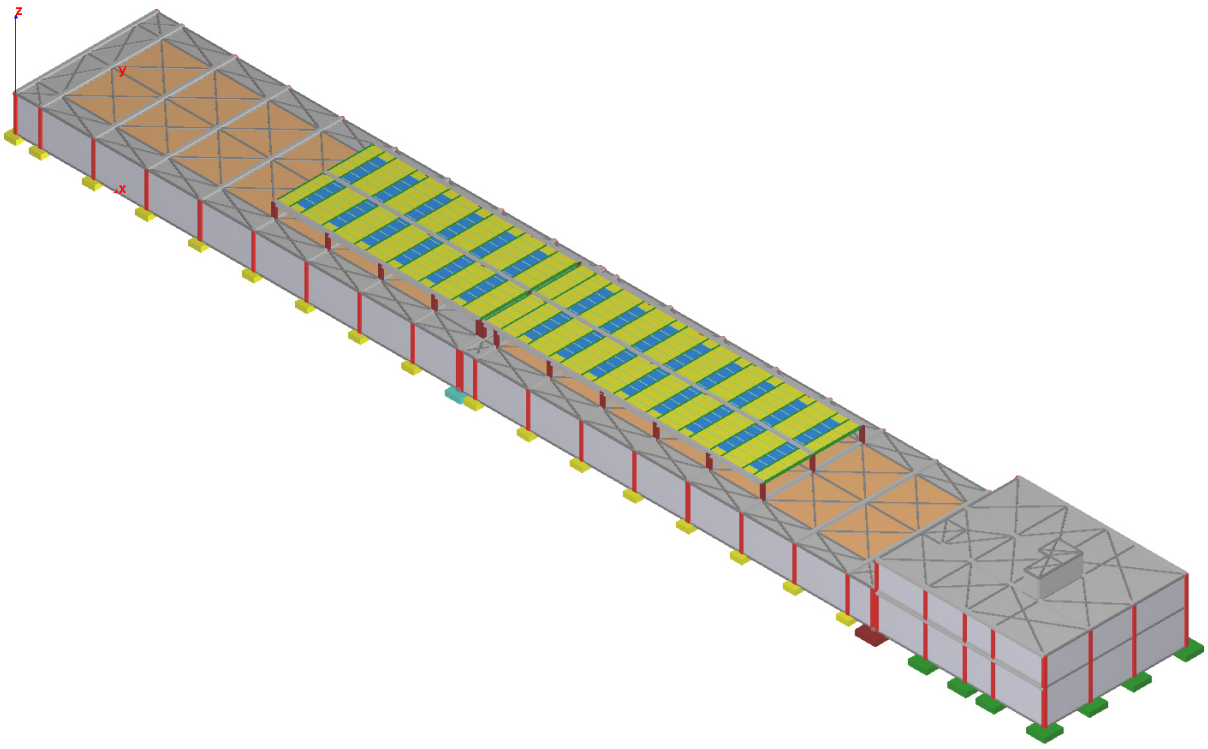

Figure 8: Three-dimensional finite element model (Solid view 2).

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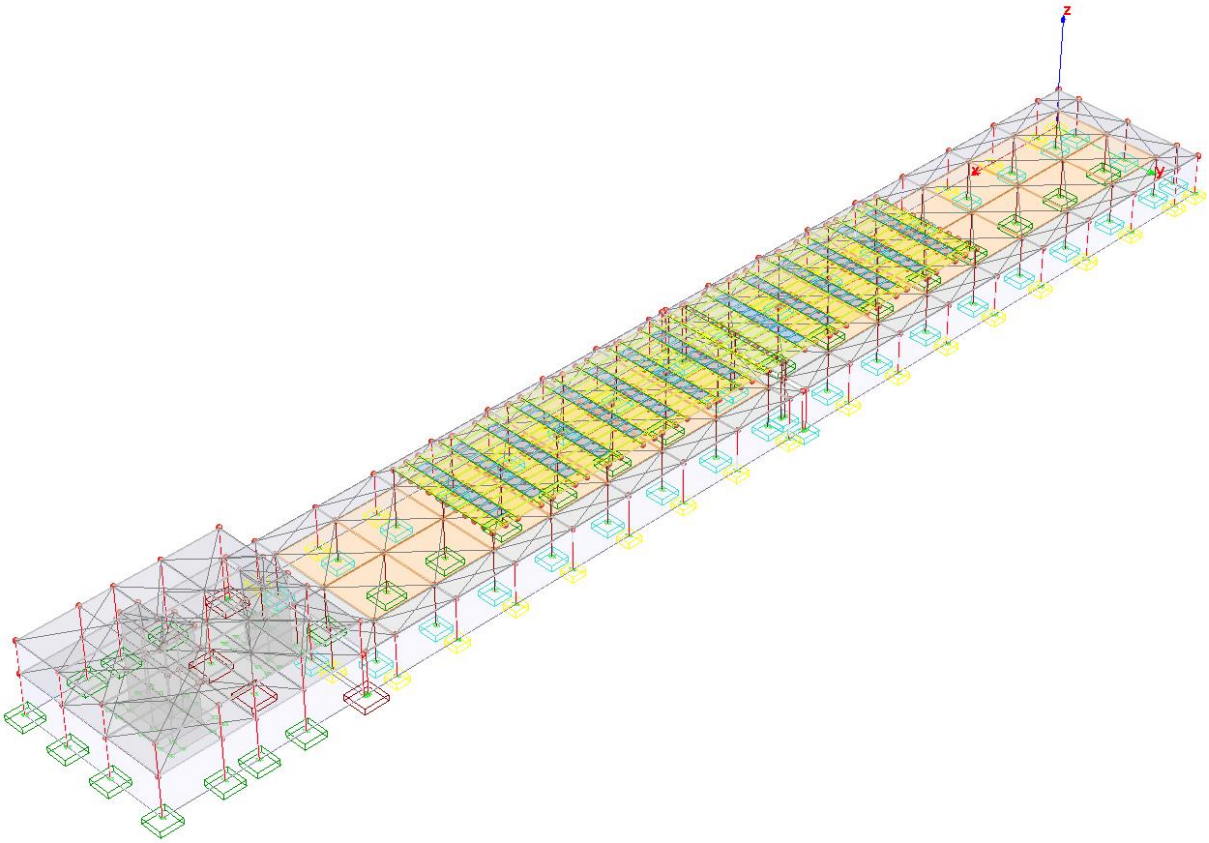

Figure 9: Three-dimensional finite element model (One-line view).

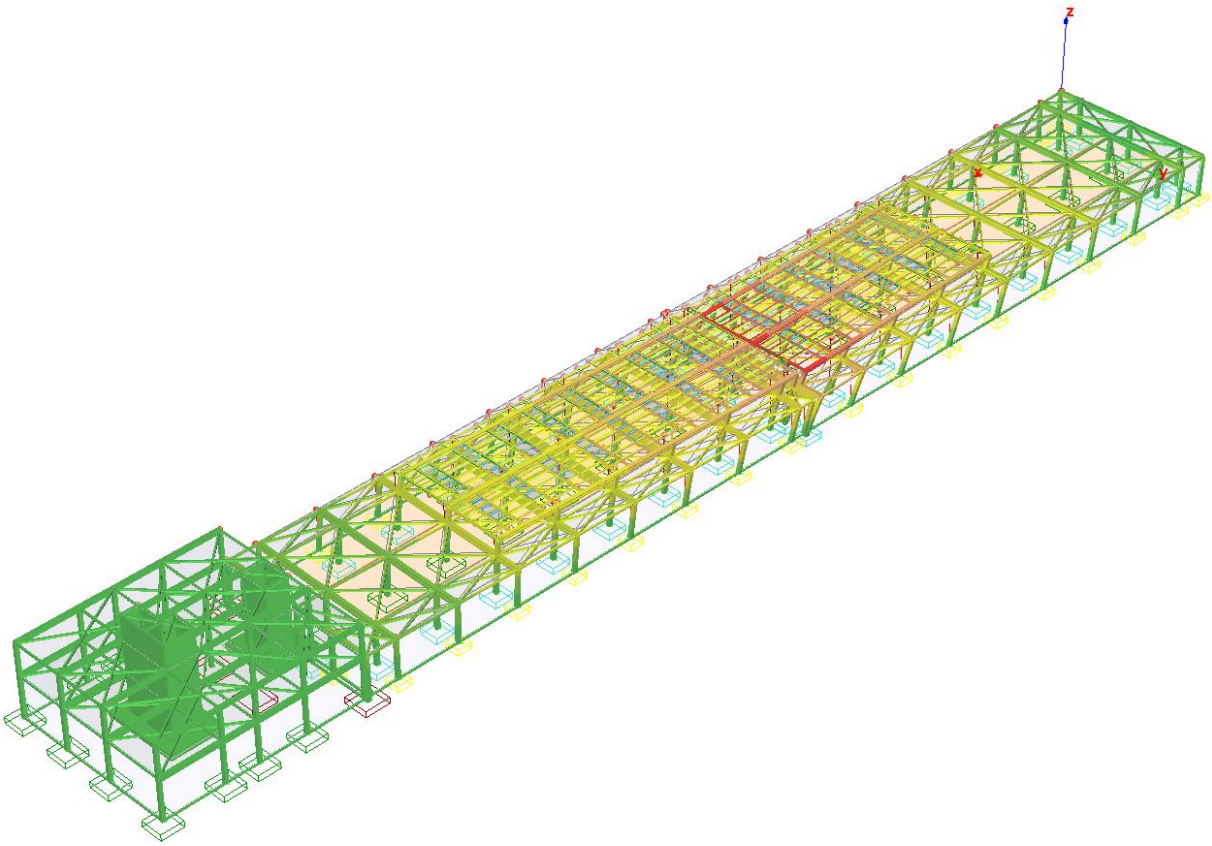

Figure 10: Flexural mode of vibration along Y = 2.21 sec.

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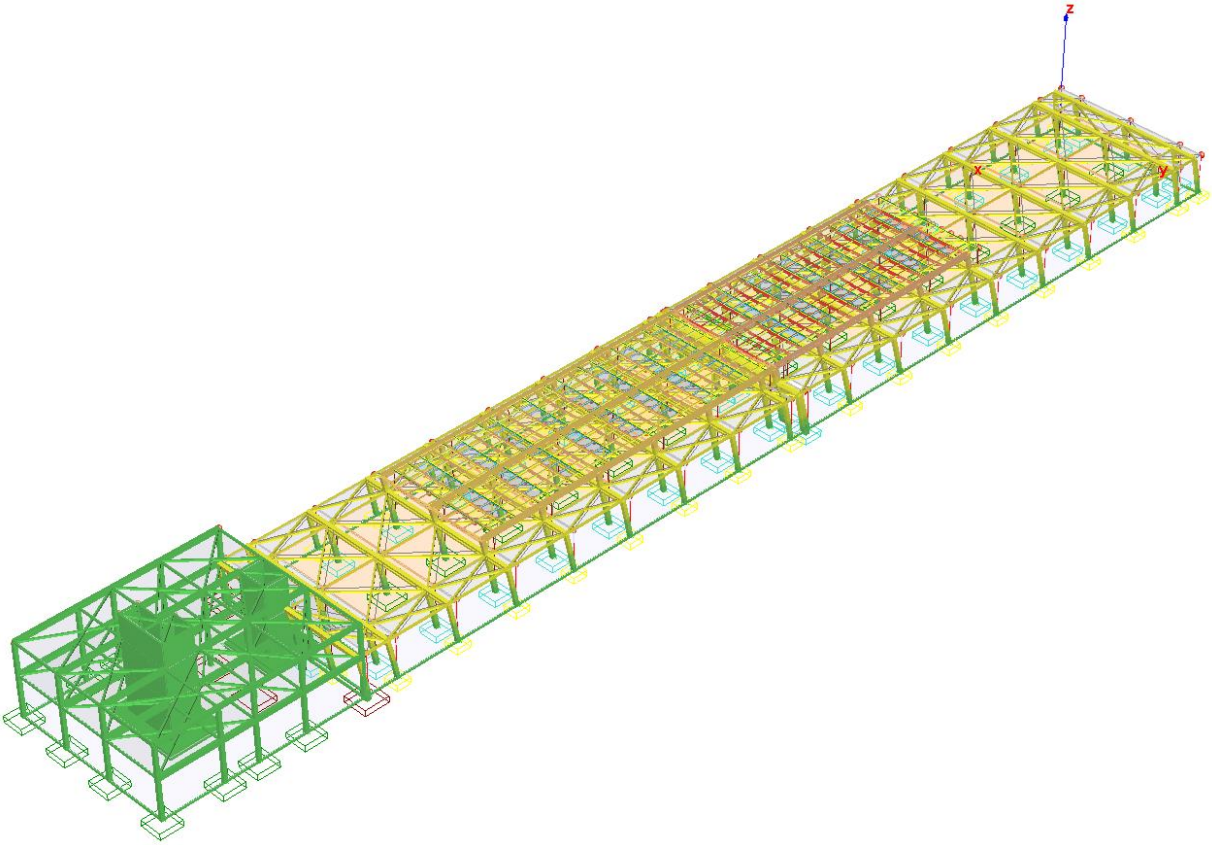

Figure 11: Long flexural mode of vibration X = 1.98 sec.

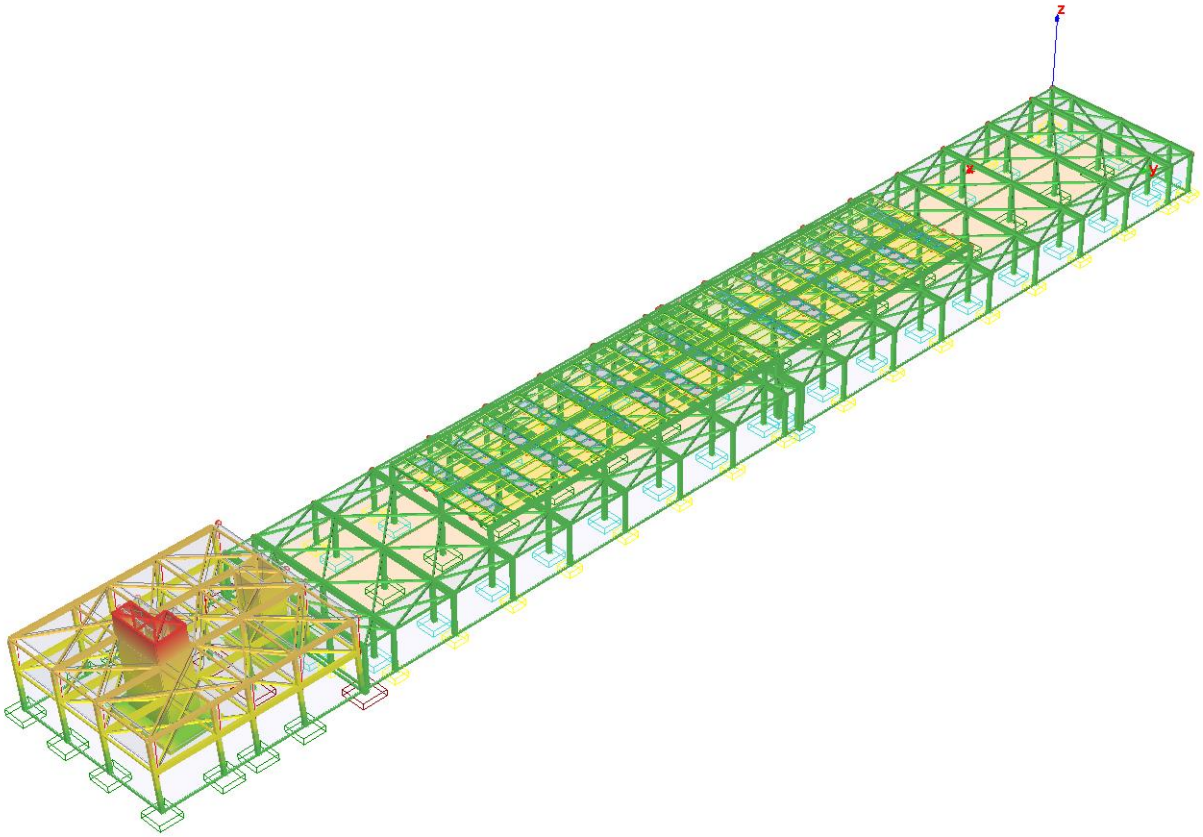

Figure 12: Long flexural mode of vibration X = 0.95 sec.

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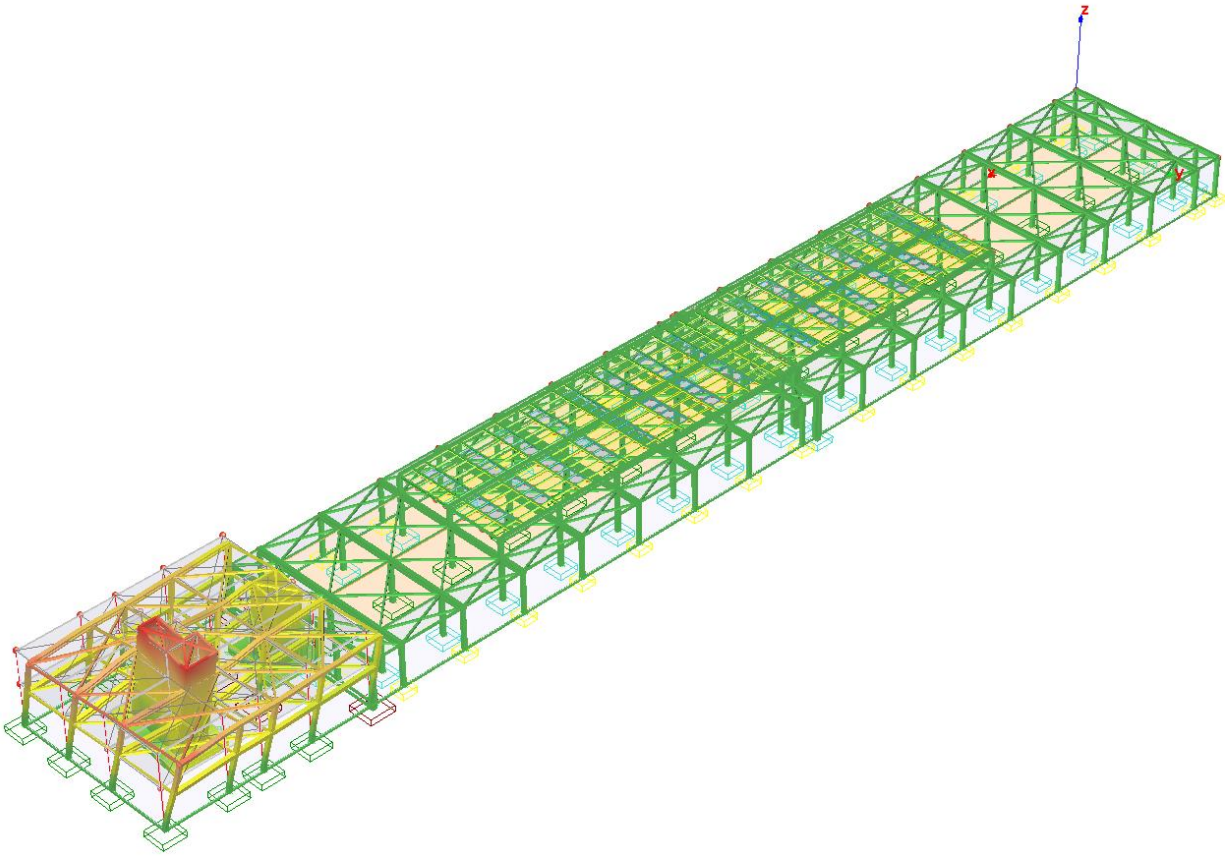

Figure 13: Long flexural mode of vibration X = 0.77 sec.

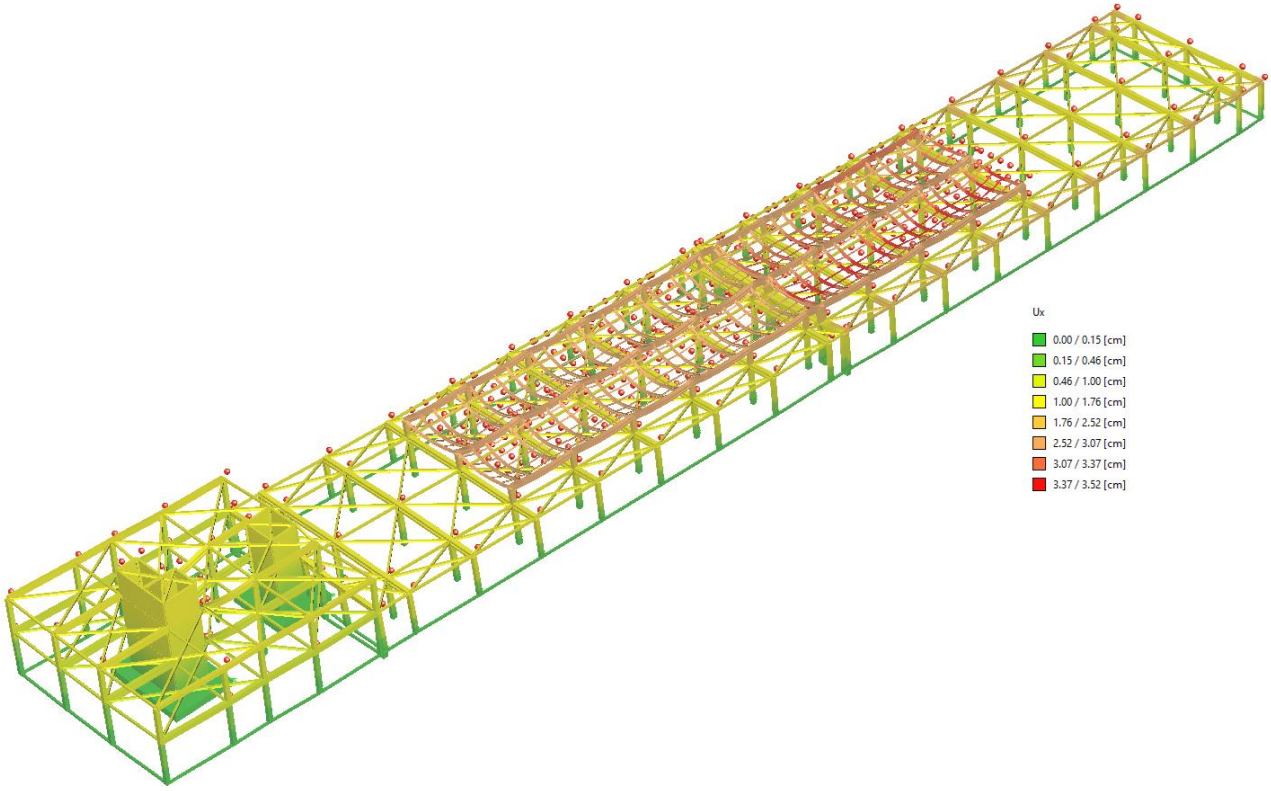

Figure 14: Deformed configuration for the seismic combination SLD X.

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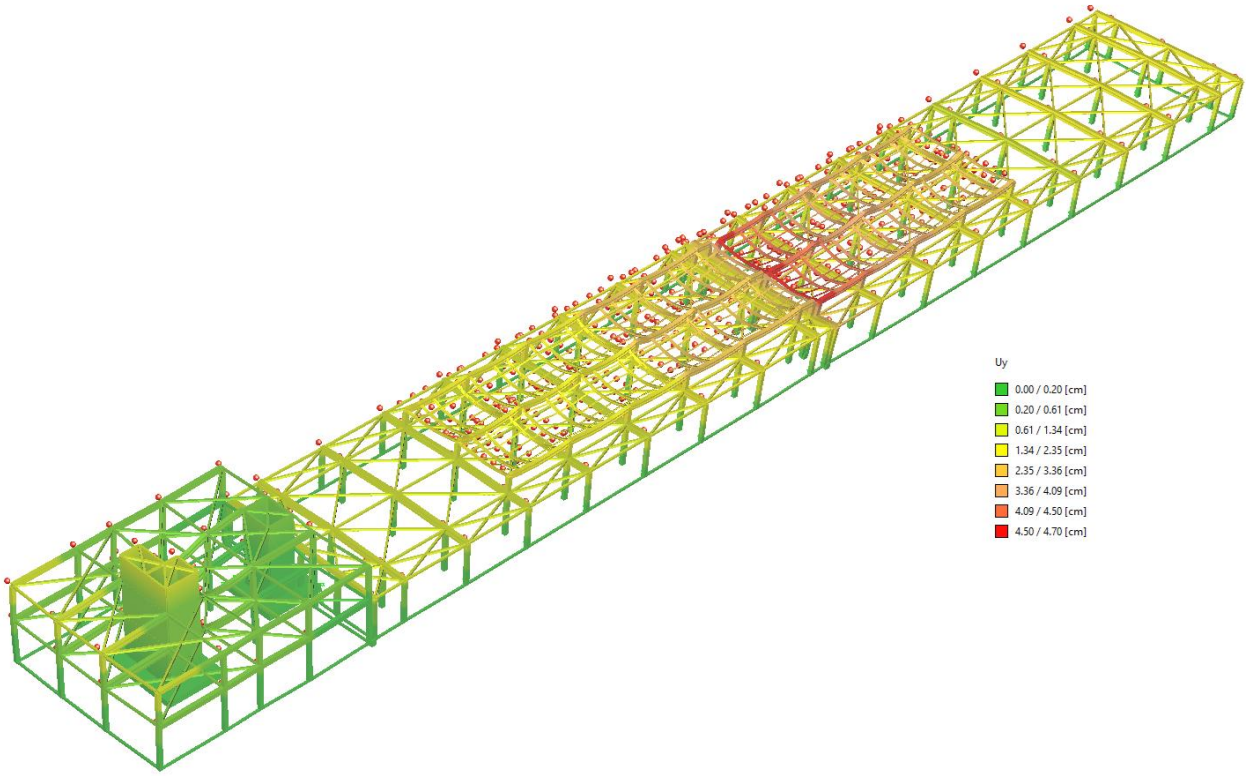

Figure 15: Deformed configuration for the seismic combination SLD Y.

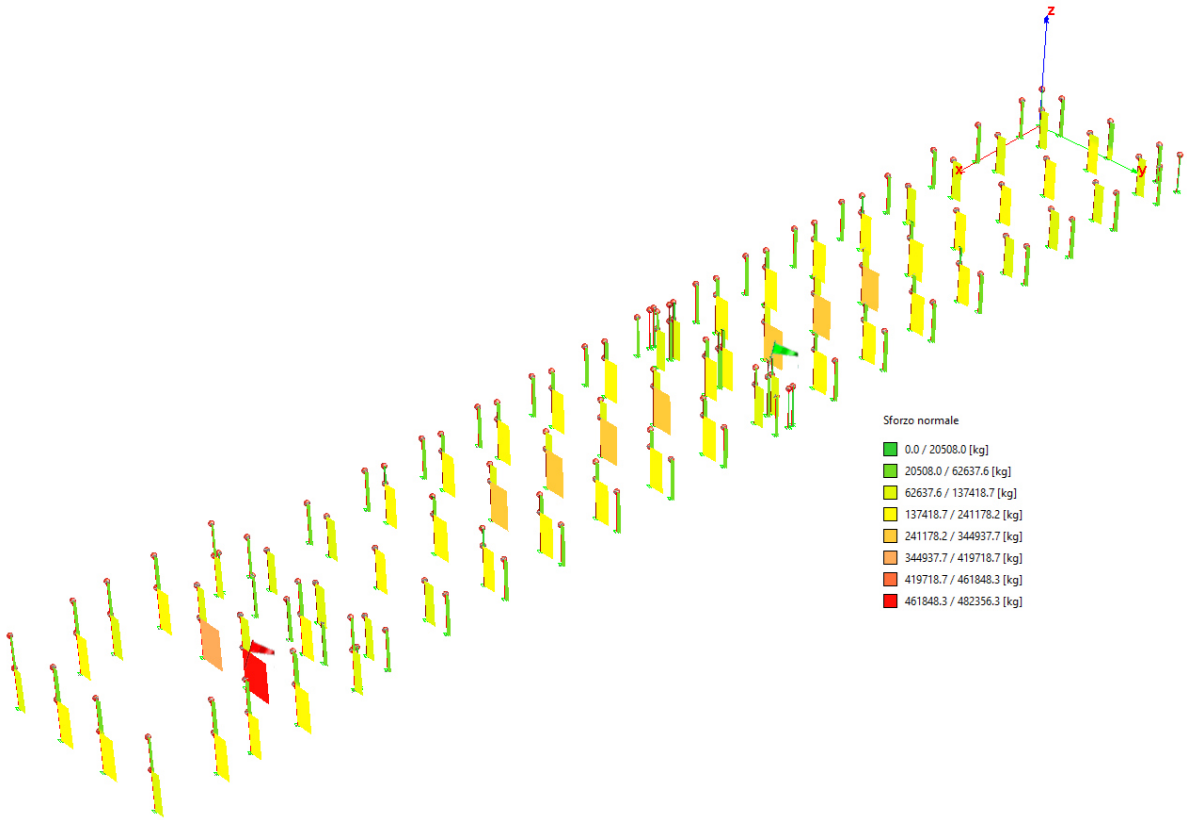

Figure 16: Diagram of the normal stress N in the precast columns, for the envelope combination.

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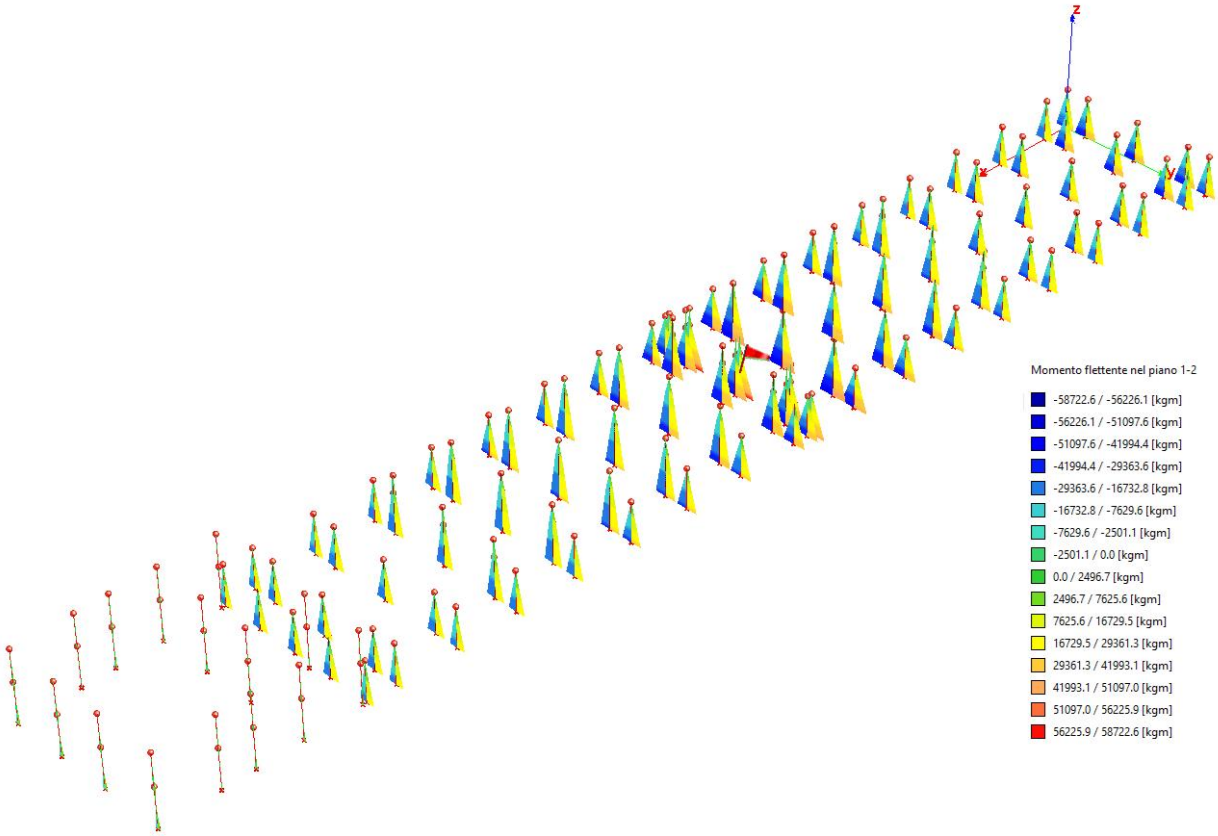

Figure 17: Diagram of the moment Mx in the columns, for the envelope combination.

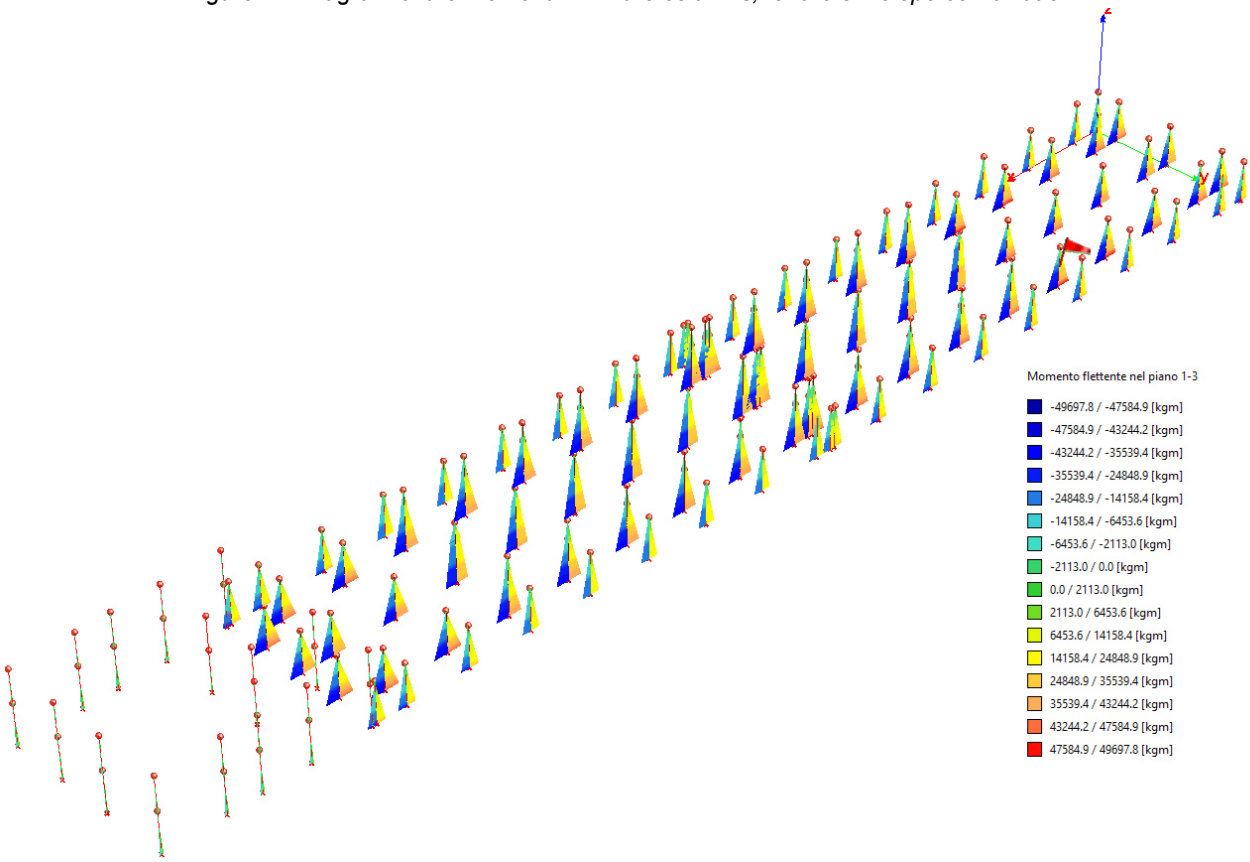

Figure 18: Diagram of the moment My in the pillars, for the envelope combination.

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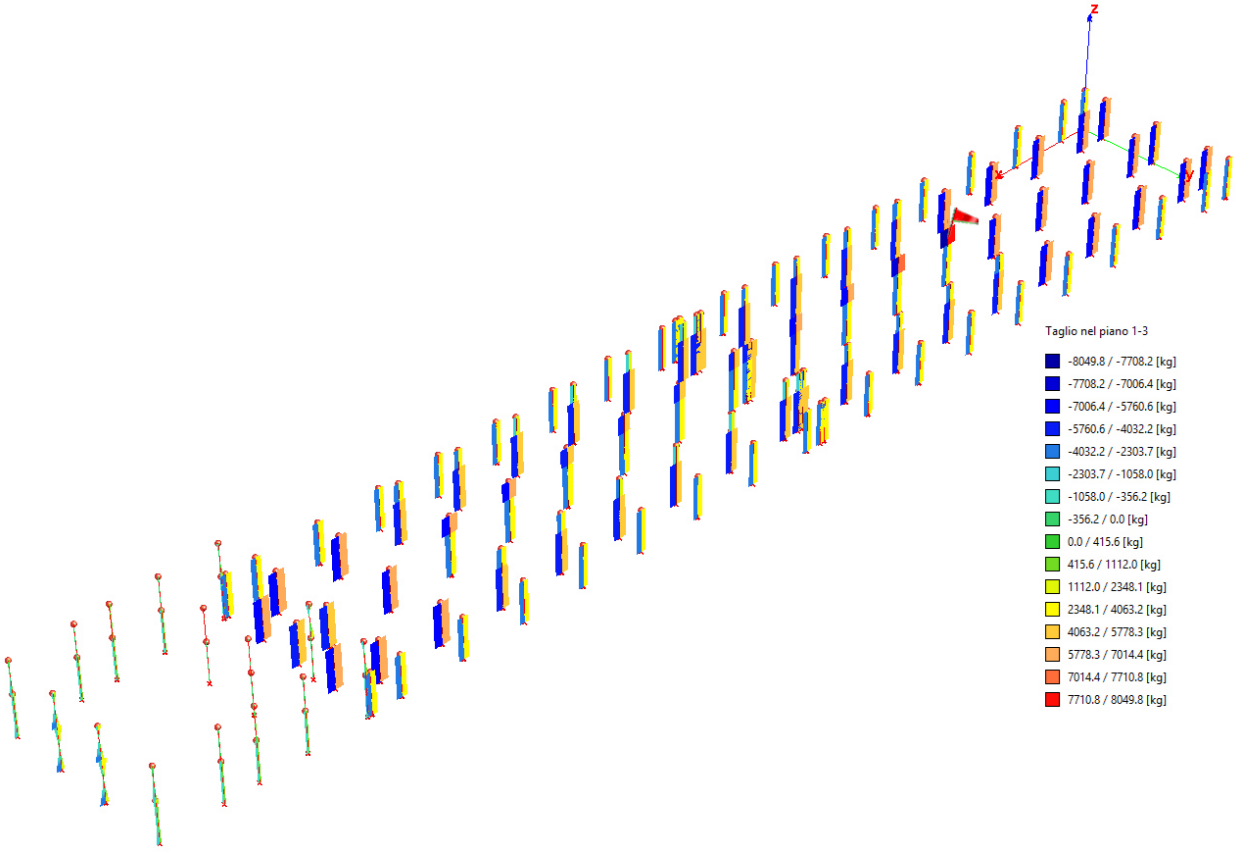

Figure 19: Diagram of the Vx cut in the columns, for the envelope combination.

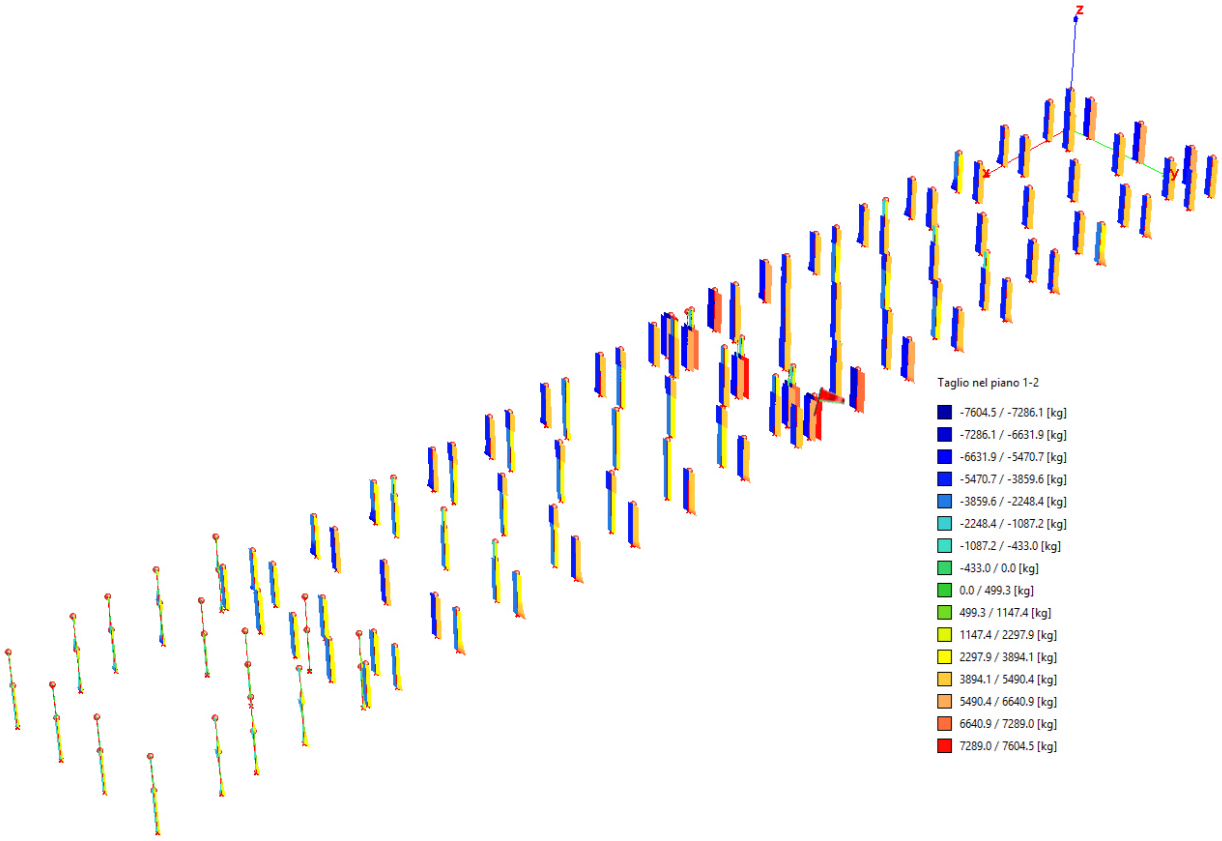

Figure 20: Diagram of the Vy cut in the columns, for the envelope combination.

PROPERTY OF DBA S.p.A. NOT USABLE OR REPRODUCIBLE (EVEN IN PART) WITHOUT WRITTEN CONSENT FROM DBA S.p.A.

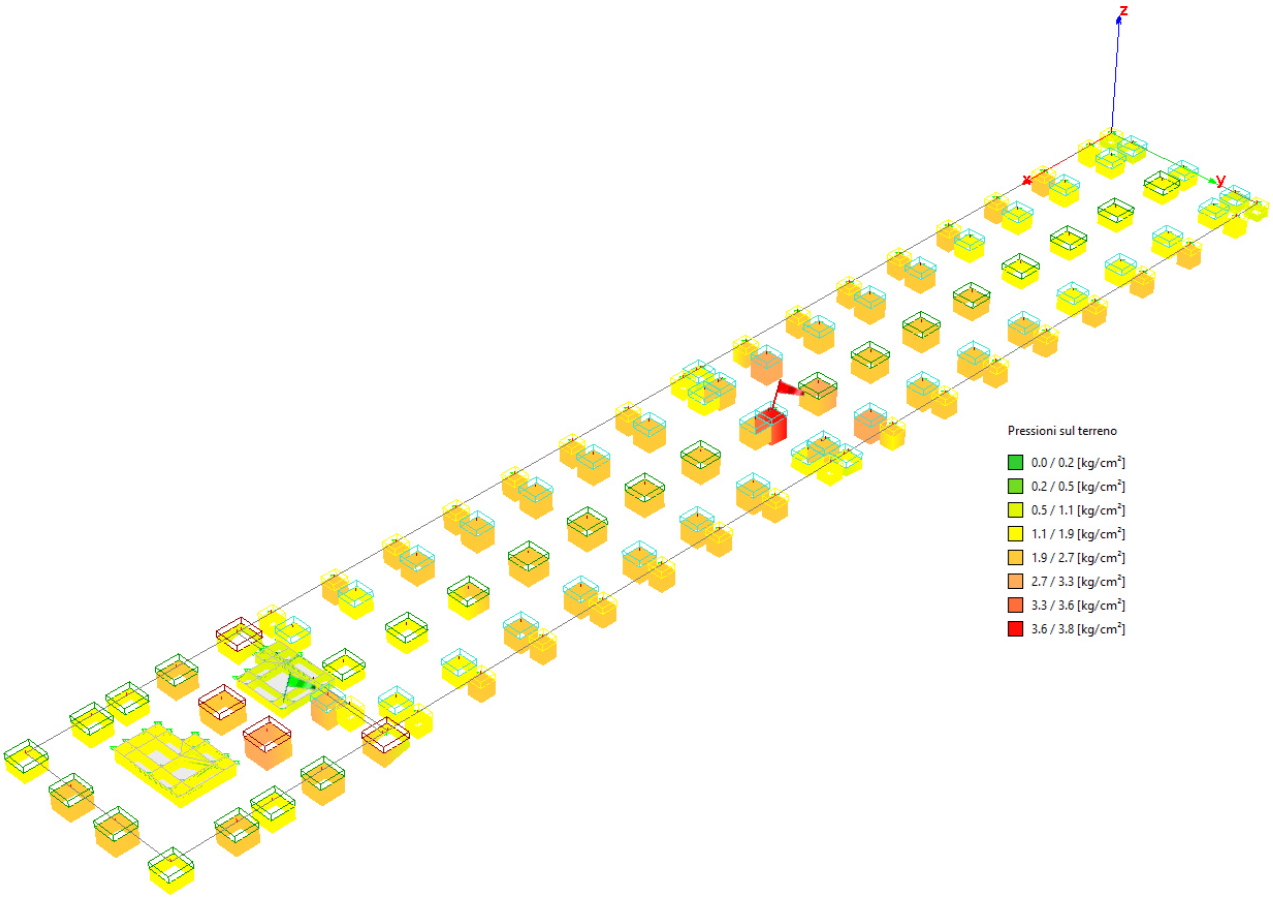

Figure 21: Diagram of the pressures on the ground.

PROPERTY OF DBA S.p.A. NOT USABLE OR REPRODUCIBLE (EVEN IN PART) WITHOUT WRITTEN CONSENT FROM DBA S.p.A.

2.1.2. Masking "GE Area"

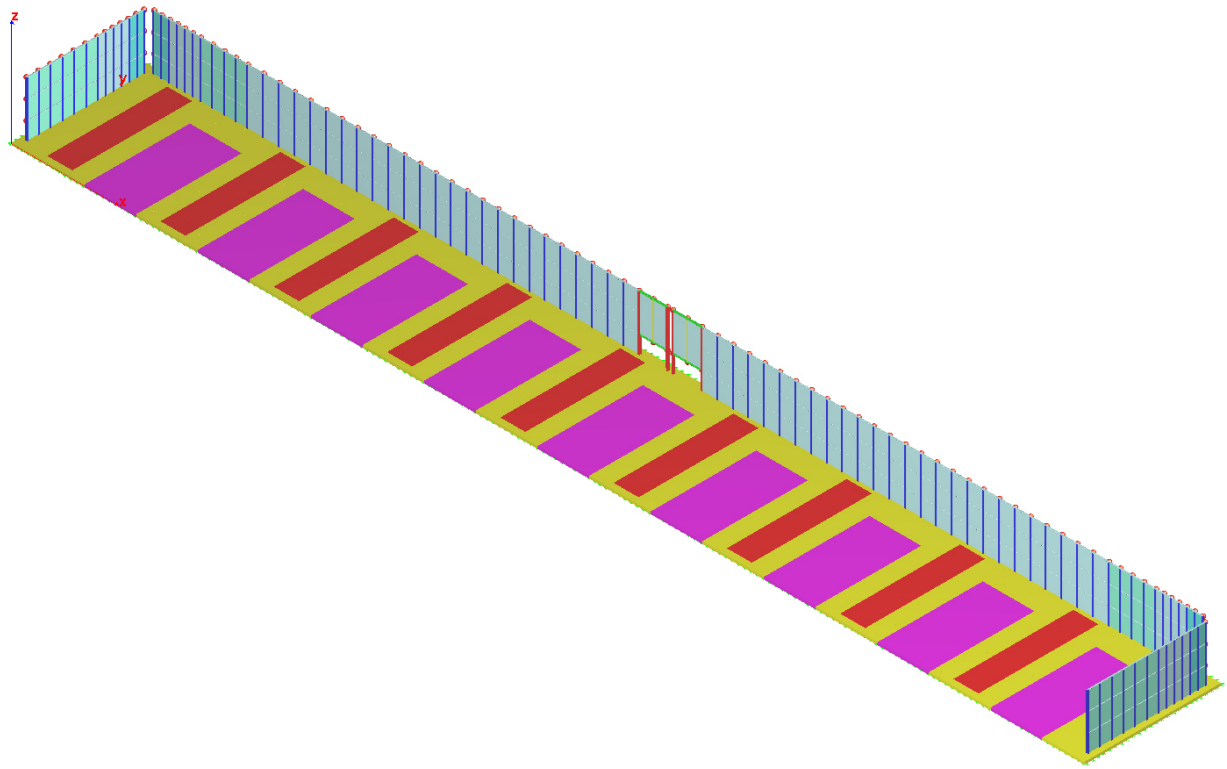

Figure 22: Three-dimensional finite element model (Solid View).

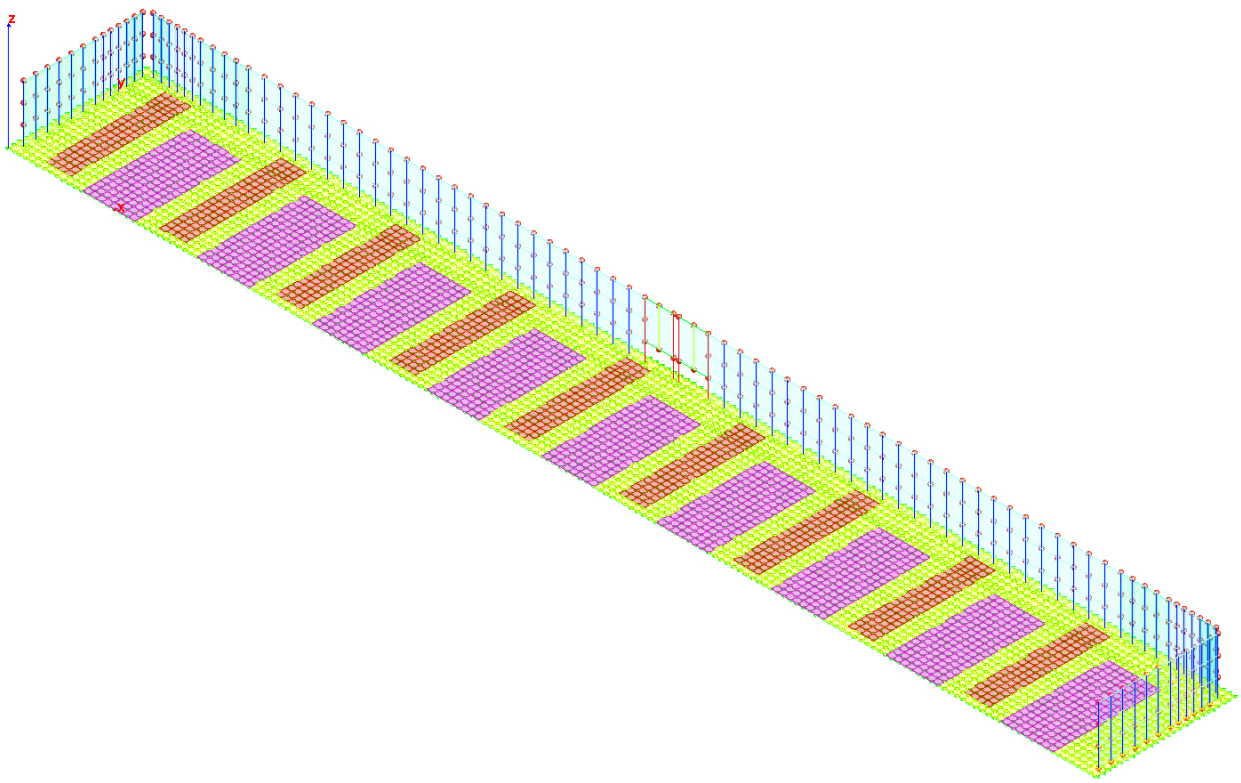

Figure 23: Three-dimensional finite element model (One-line view).

PROPERTY OF DBA S.p.A. NOT USABLE OR REPRODUCIBLE (EVEN IN PART) WITHOUT WRITTEN CONSENT FROM DBA S.p.A.

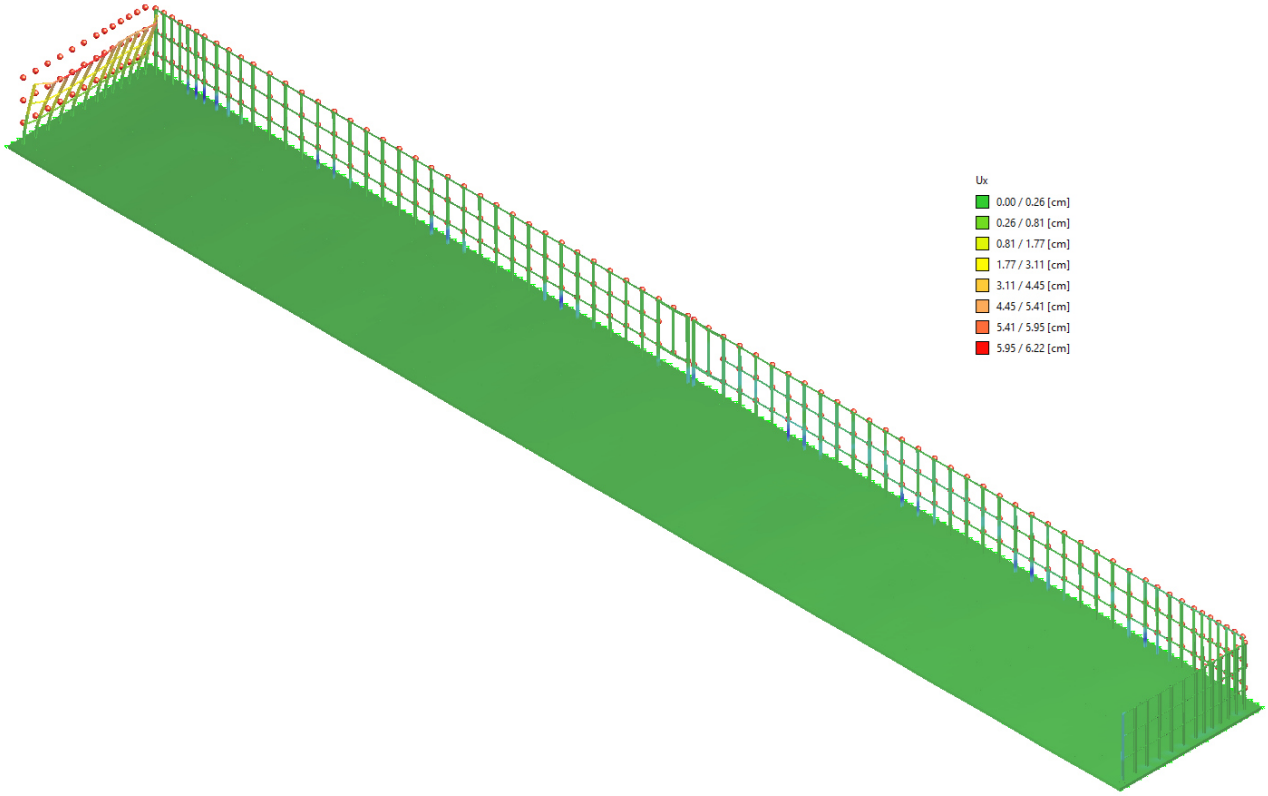

Figure 24: Warped configuration for the SLE Vento X combination.

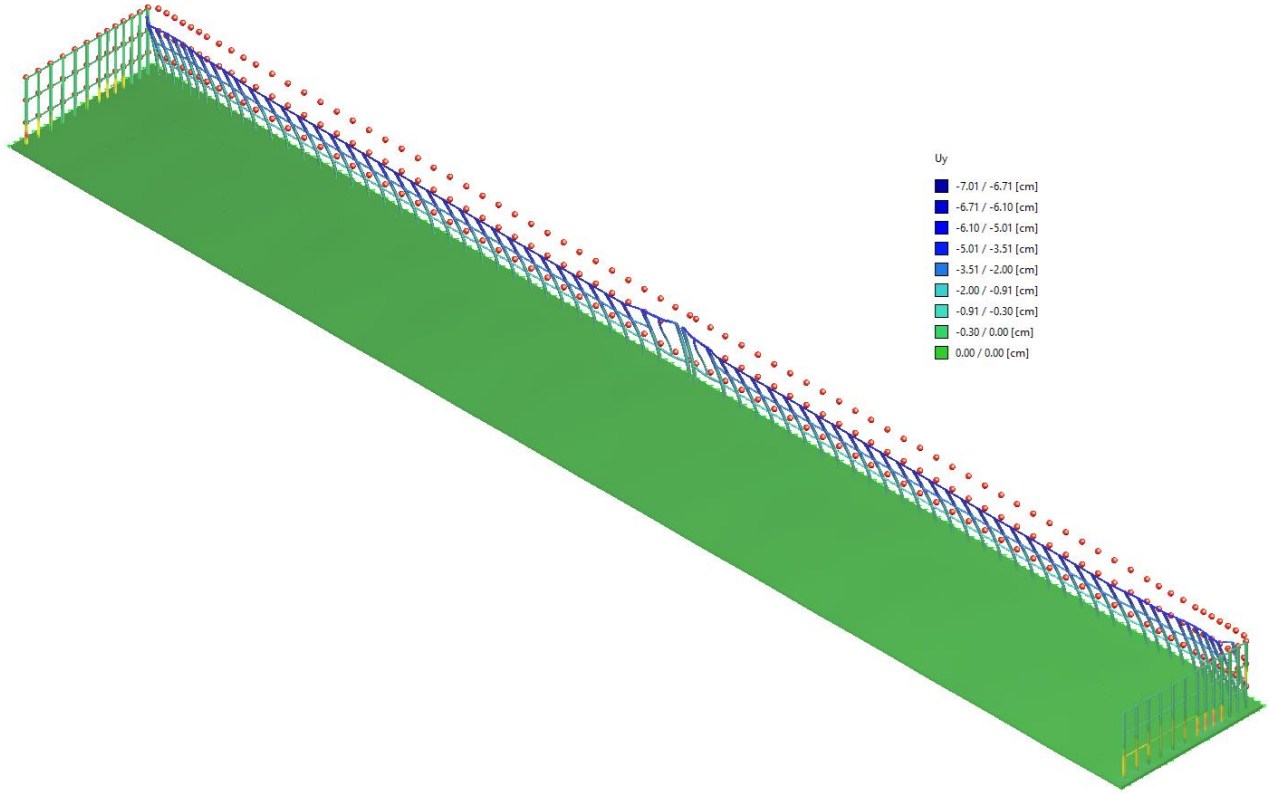

Figure 25: Deformed configuration for the seismic combination SLE Wind Y.

PROPERTY OF DBA S.p.A. NOT USABLE OR REPRODUCIBLE (EVEN IN PART) WITHOUT WRITTEN CONSENT FROM DBA S.p.A.

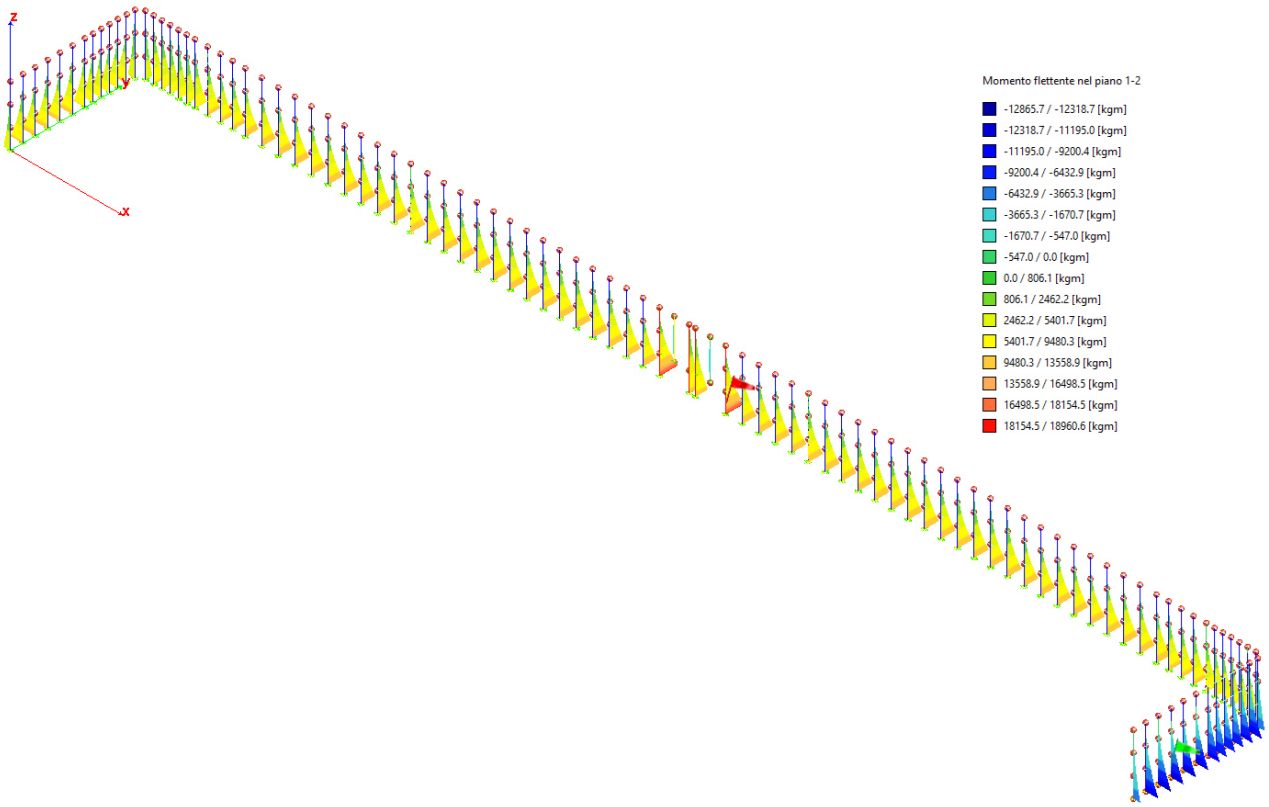

Figure 26: Diagram of the moment Mx in the uprights, for the envelope combination.

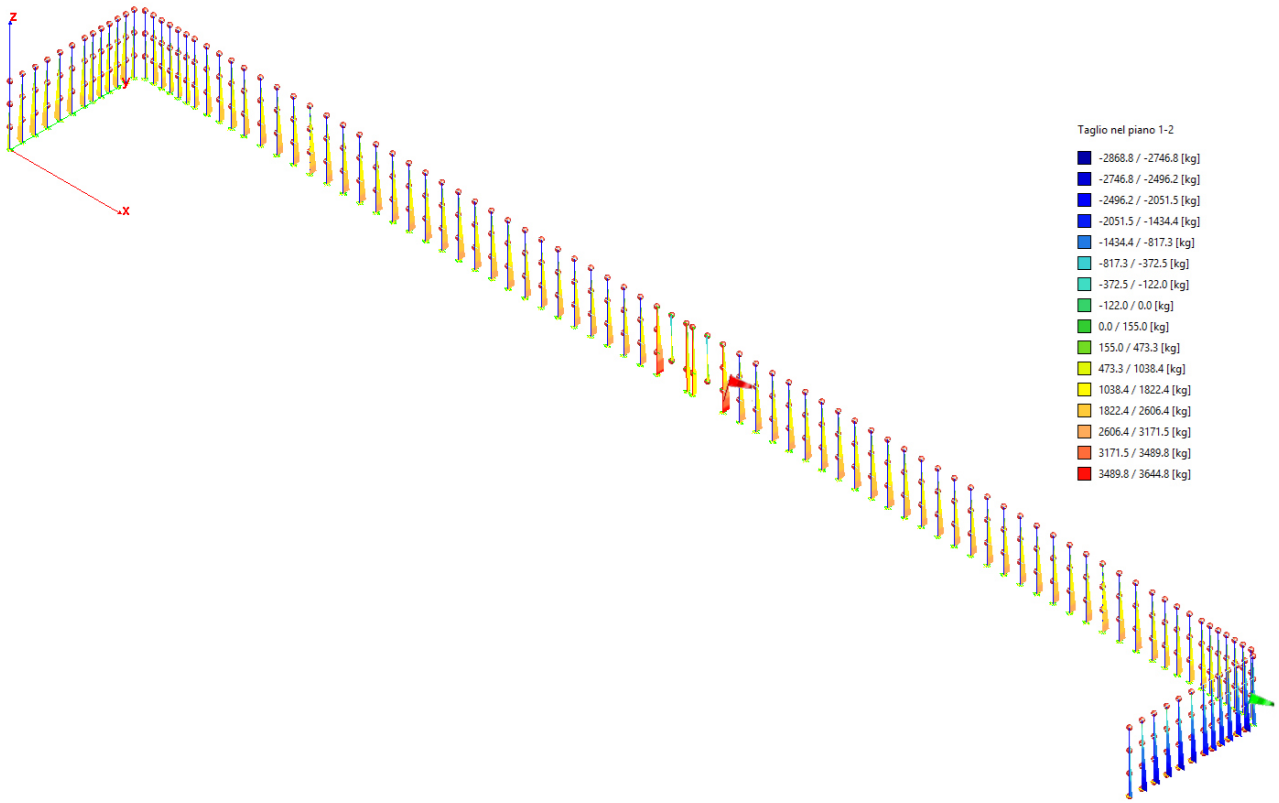

Figure 27: Diagram of the Vx cut in the uprights, for the envelope combination.

PROPERTY OF DBA S.p.A. NOT USABLE OR REPRODUCIBLE (EVEN IN PART) WITHOUT WRITTEN CONSENT FROM DBA S.p.A.

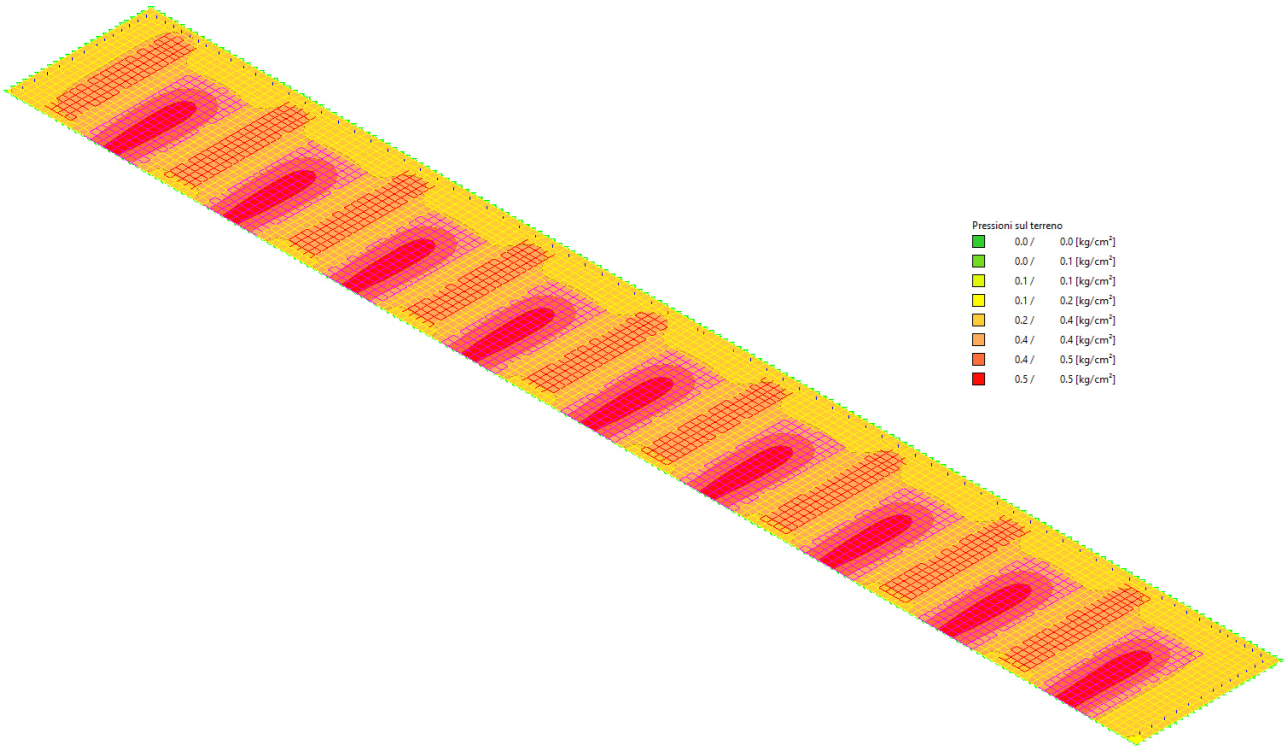

Figure 28: Diagram of the pressures on the ground.

PROPERTY OF DBA S.p.A. NOT USABLE OR REPRODUCIBLE (EVEN IN PART) WITHOUT WRITTEN CONSENT FROM DBA S.p.A.

2.1.3. Masking "Chiller Platform"

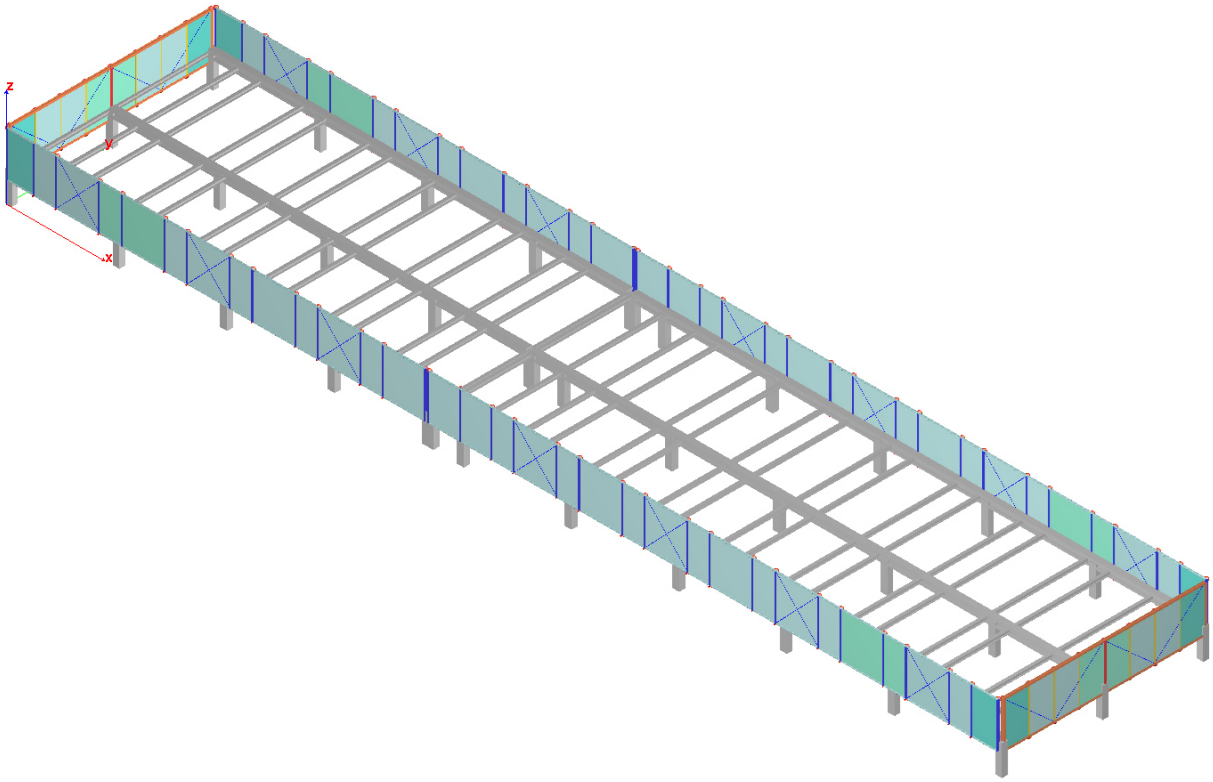

Figure 29: Three-dimensional finite element model (Solid View).

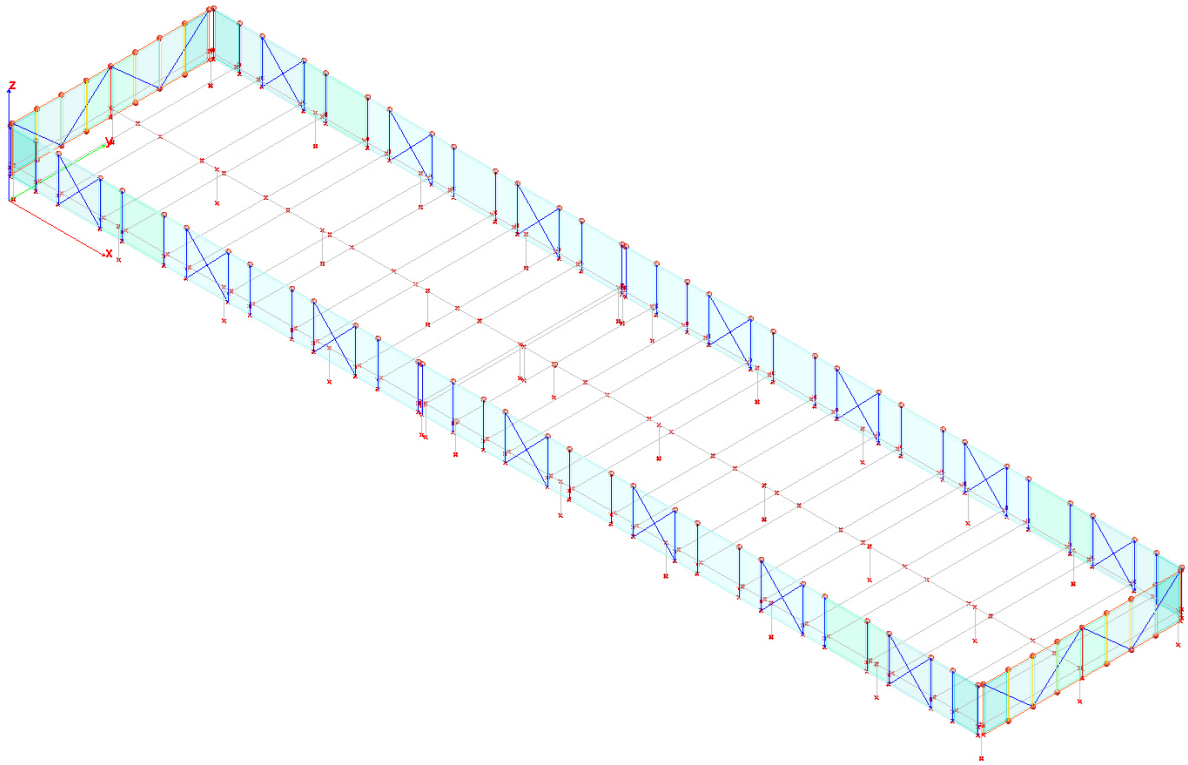

Figure 30: Three-dimensional finite element model (One-line view).

PROPERTY OF DBA S.p.A. NOT USABLE OR REPRODUCIBLE (EVEN IN PART) WITHOUT WRITTEN CONSENT FROM DBA S.p.A.

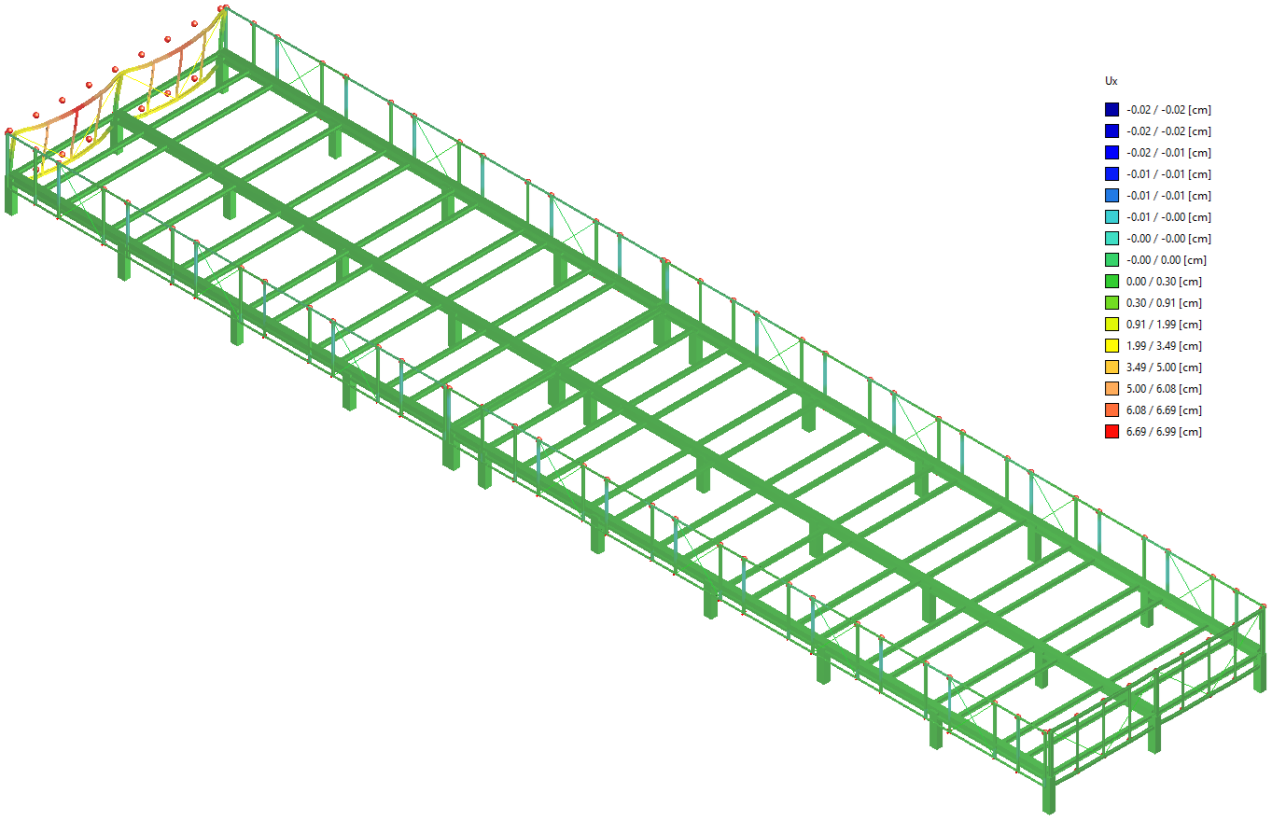

Figure 31: Warped configuration for the SLE Vento X combination.

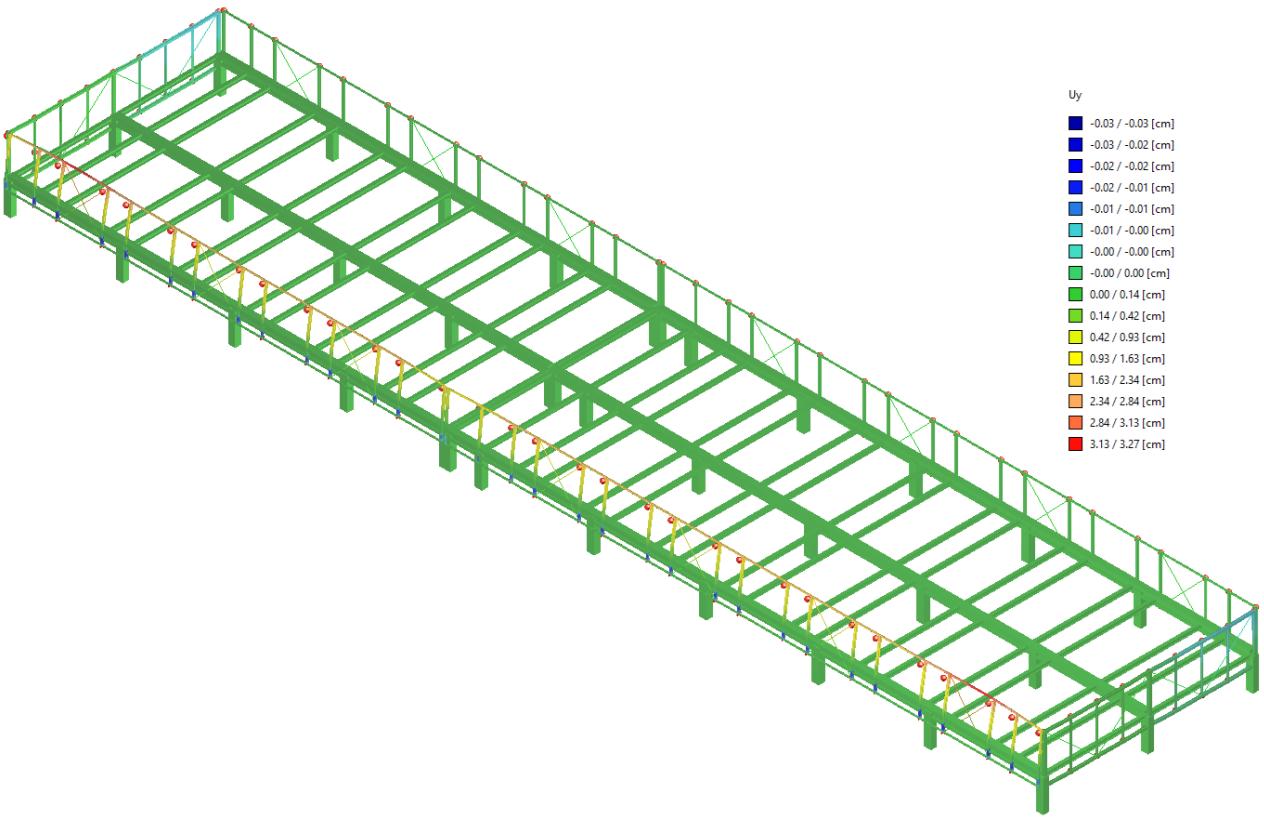

Figure 32: Deformed configuration for the seismic combination SLE Wind Y.

PROPERTY OF DBA S.p.A. NOT USABLE OR REPRODUCIBLE (EVEN IN PART) WITHOUT WRITTEN CONSENT FROM DBA S.p.A.

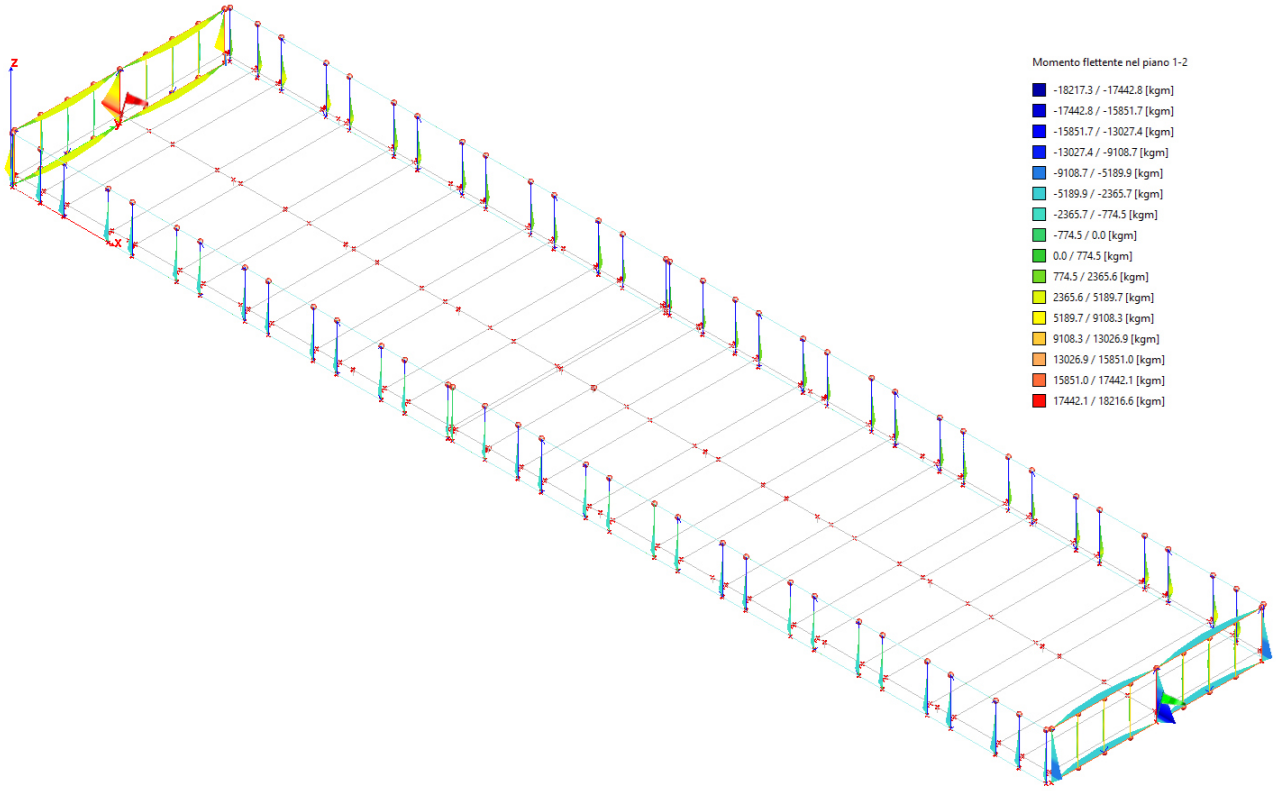

Figure 33: Diagram of the moment Mx in metal profiles, for the envelope combination.

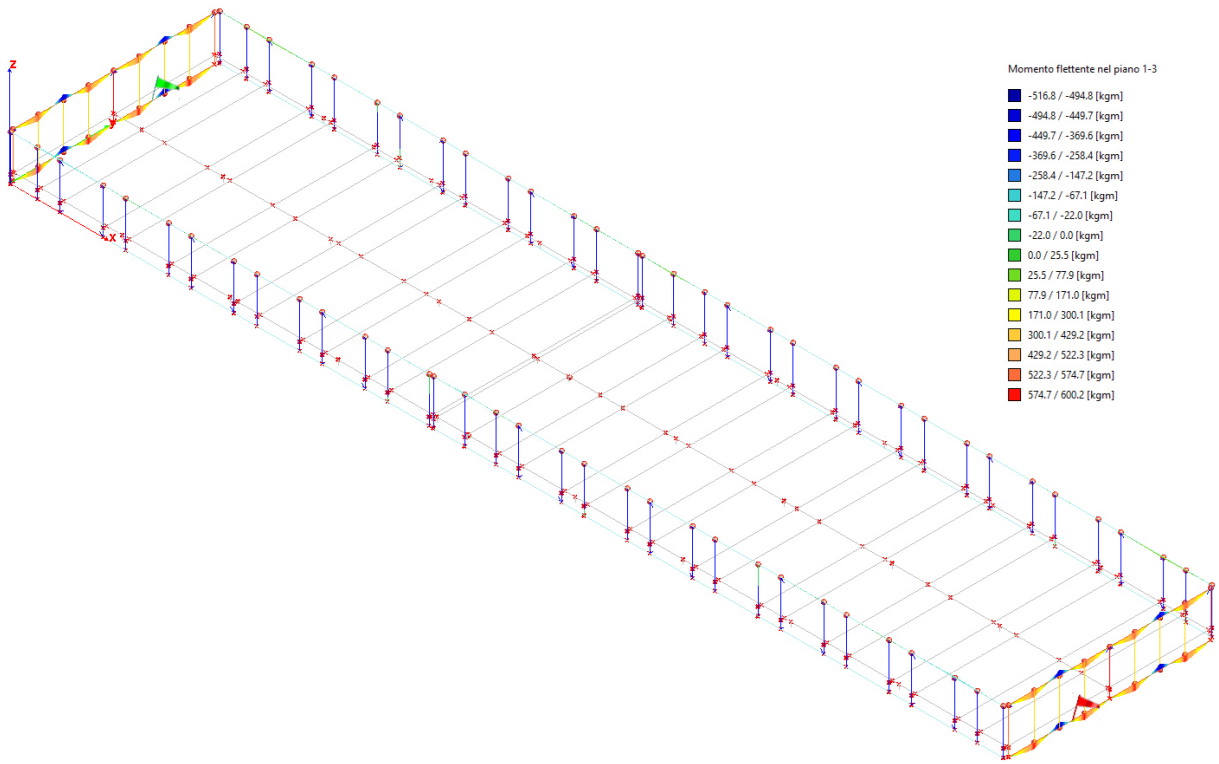

Figure 34: Diagram of the moment My in metal profiles, for the envelope combination.

PROPERTY OF DBA S.p.A. NOT USABLE OR REPRODUCIBLE (EVEN IN PART) WITHOUT WRITTEN CONSENT FROM DBA S.p.A.

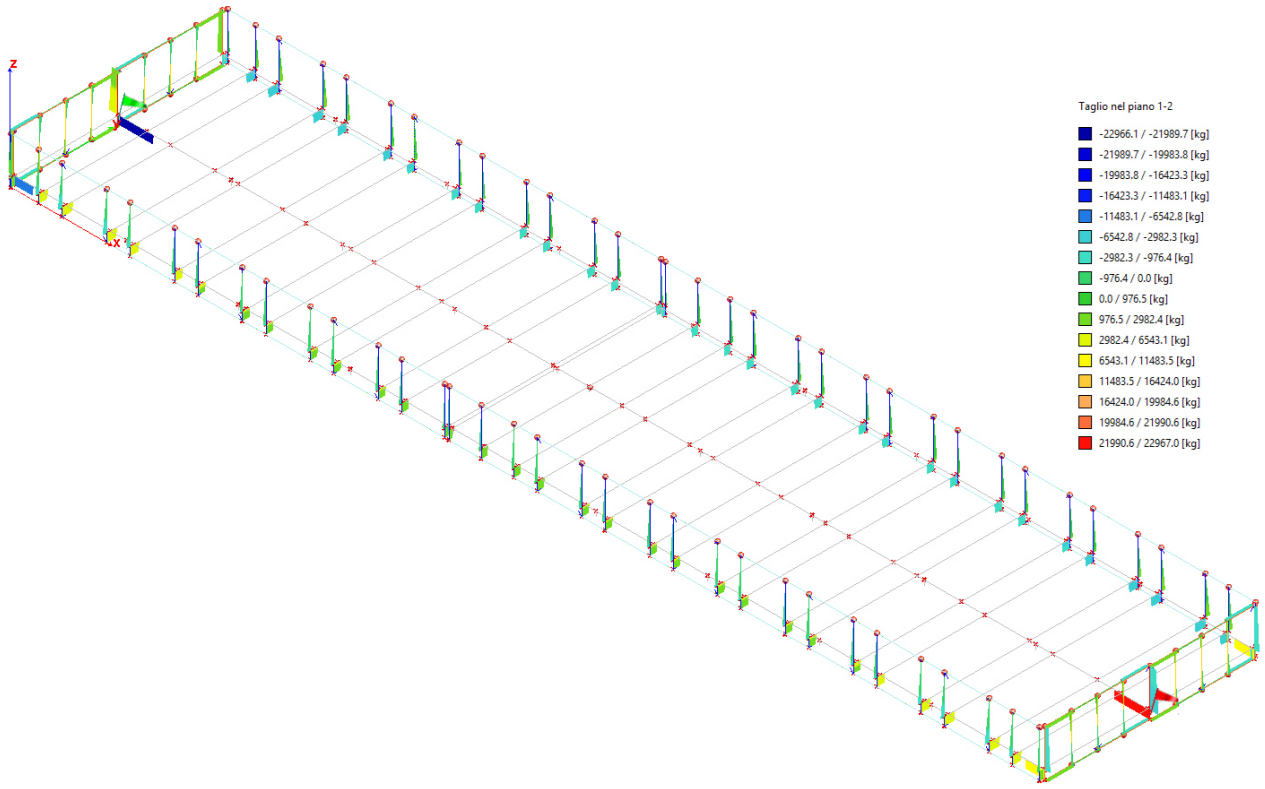

Figure 35: Diagram of the Vx cut in metal profiles, for the envelope combination.

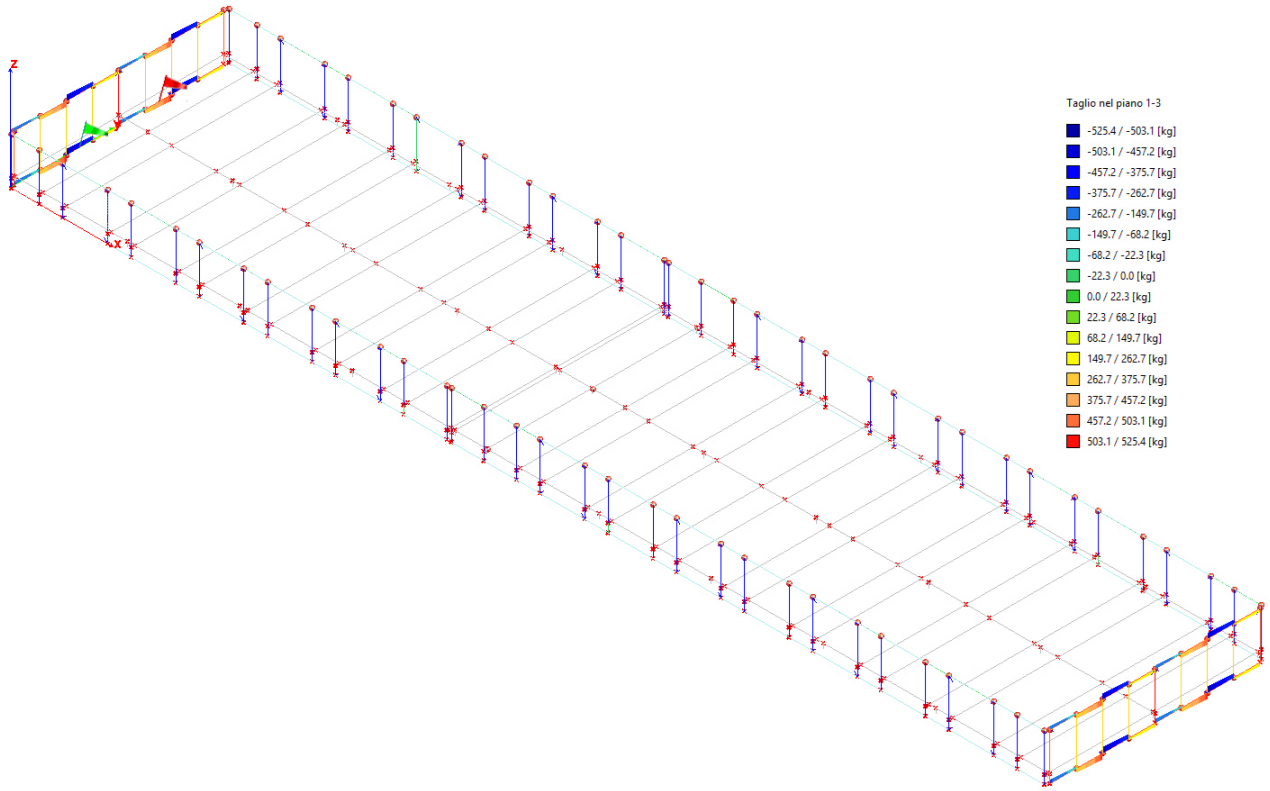

Figure 36: Diagram of Vy cut in metal profiles, for envelope combination.

PROPERTY OF DBA S.p.A. NOT USABLE OR REPRODUCIBLE (EVEN IN PART) WITHOUT WRITTEN CONSENT FROM DBA S.p.A.

2.1.4. Façade frame of offices

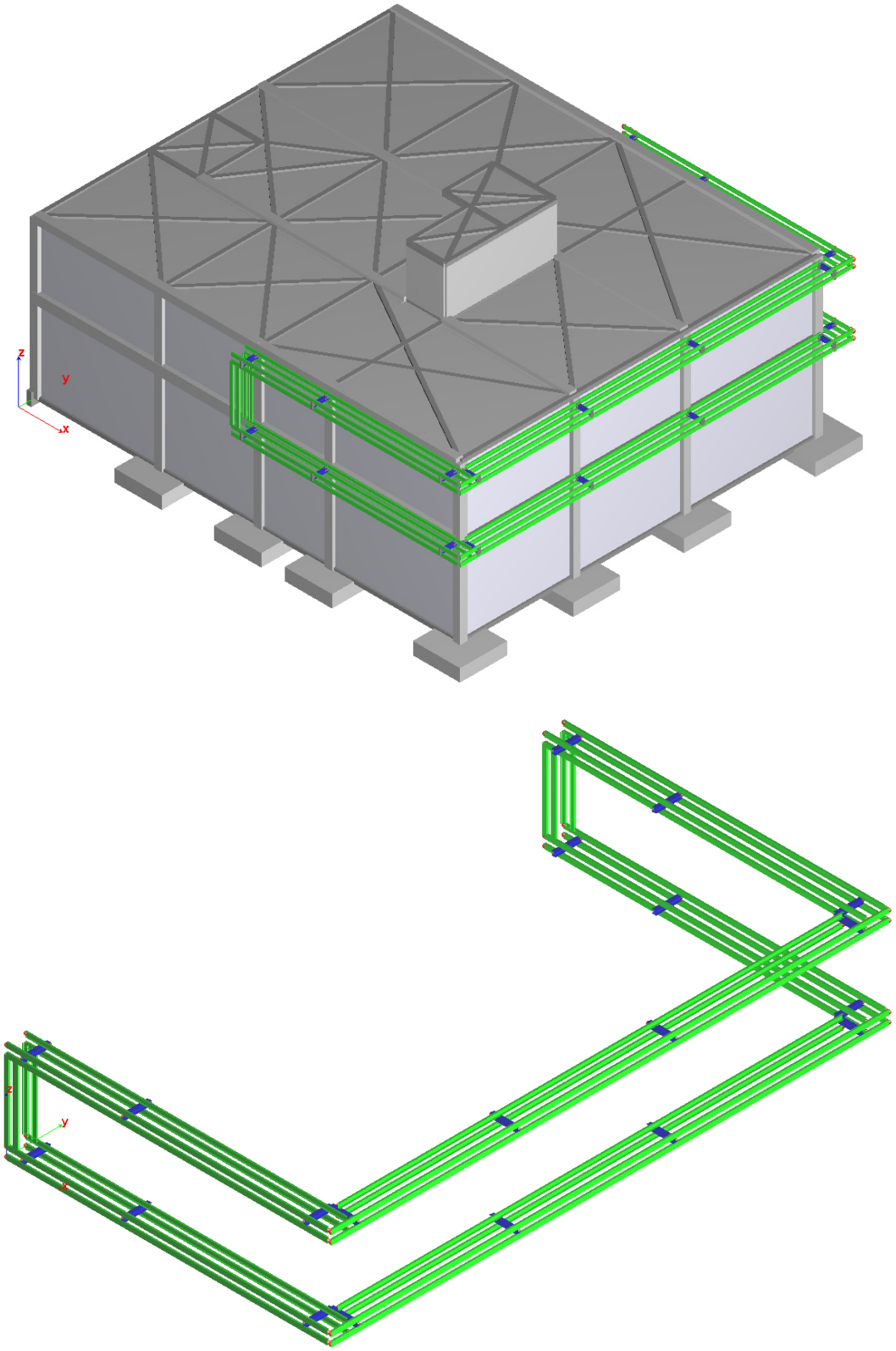

Figure 37: Three-dimensional finite element model (Solid View).

PROPERTY OF DBA S.p.A. NOT USABLE OR REPRODUCIBLE (EVEN IN PART) WITHOUT WRITTEN CONSENT FROM DBA S.p.A.

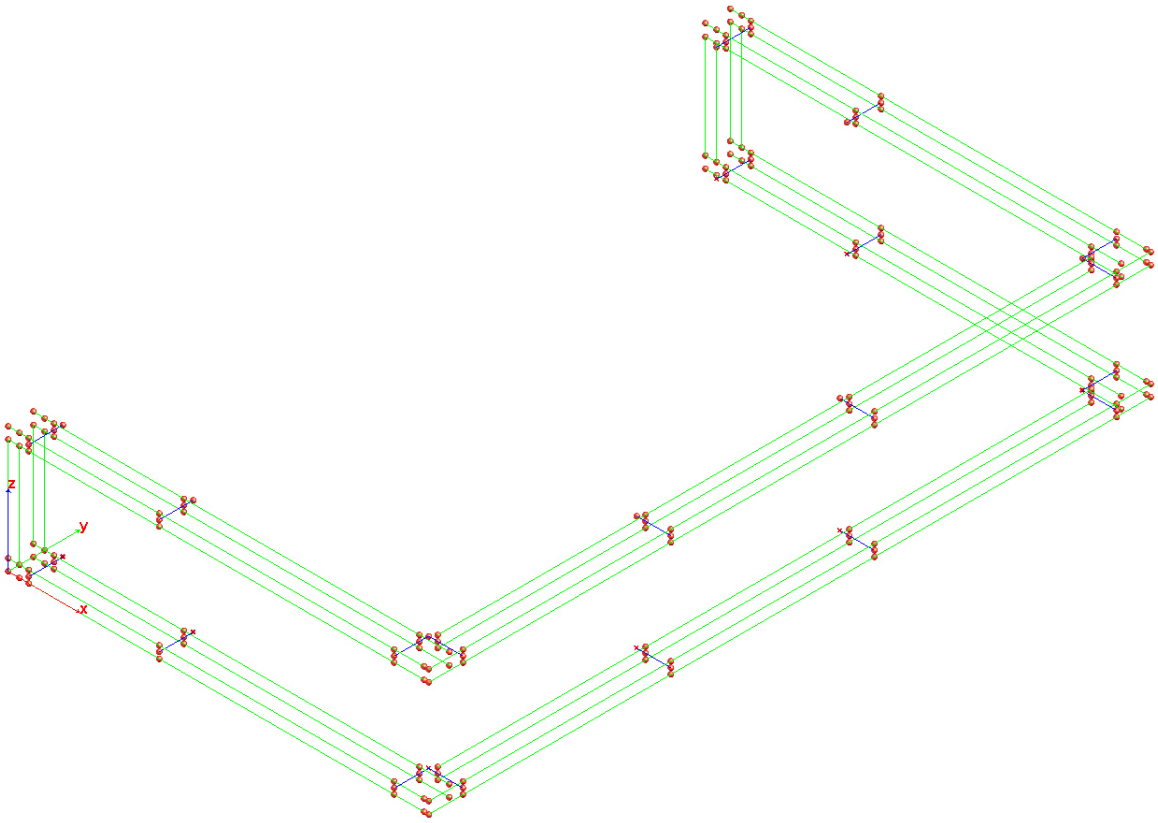

Figure 38: Three-dimensional finite element model (One-line view).

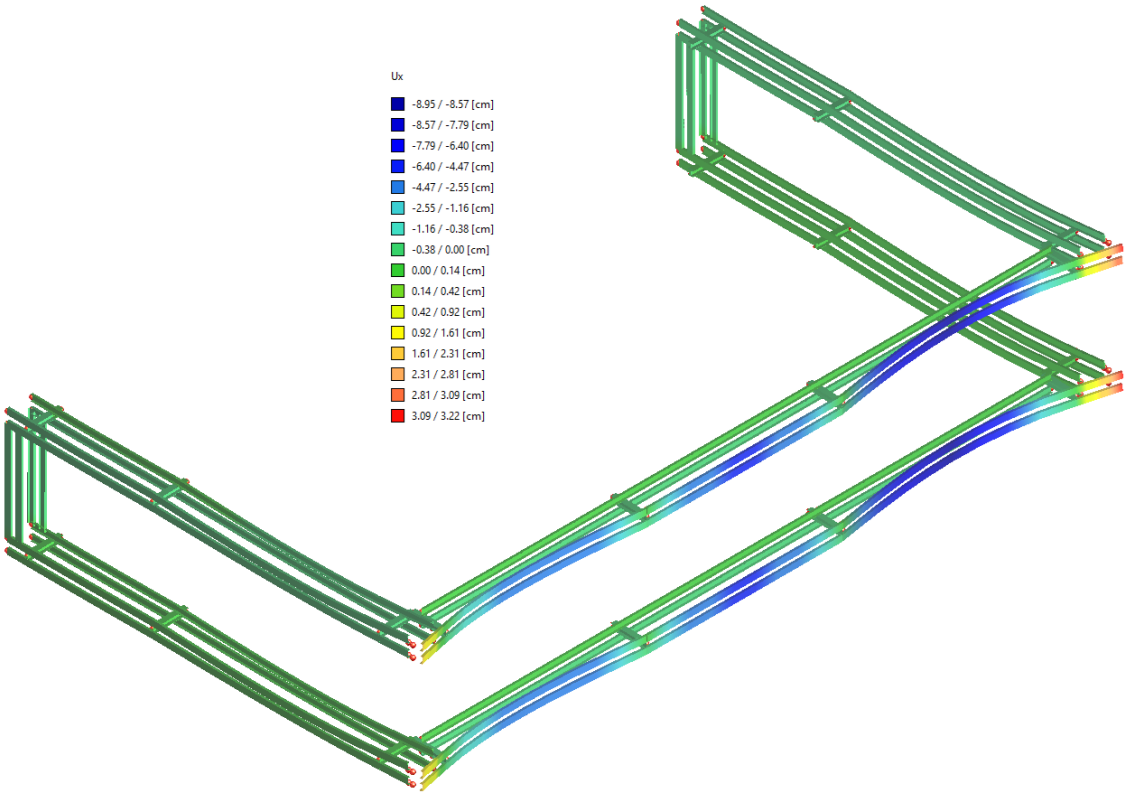

Figure 39: Warped configuration for the SLE Vento X combination.

PROPERTY OF DBA S.p.A. NOT USABLE OR REPRODUCIBLE (EVEN IN PART) WITHOUT WRITTEN CONSENT FROM DBA S.p.A.

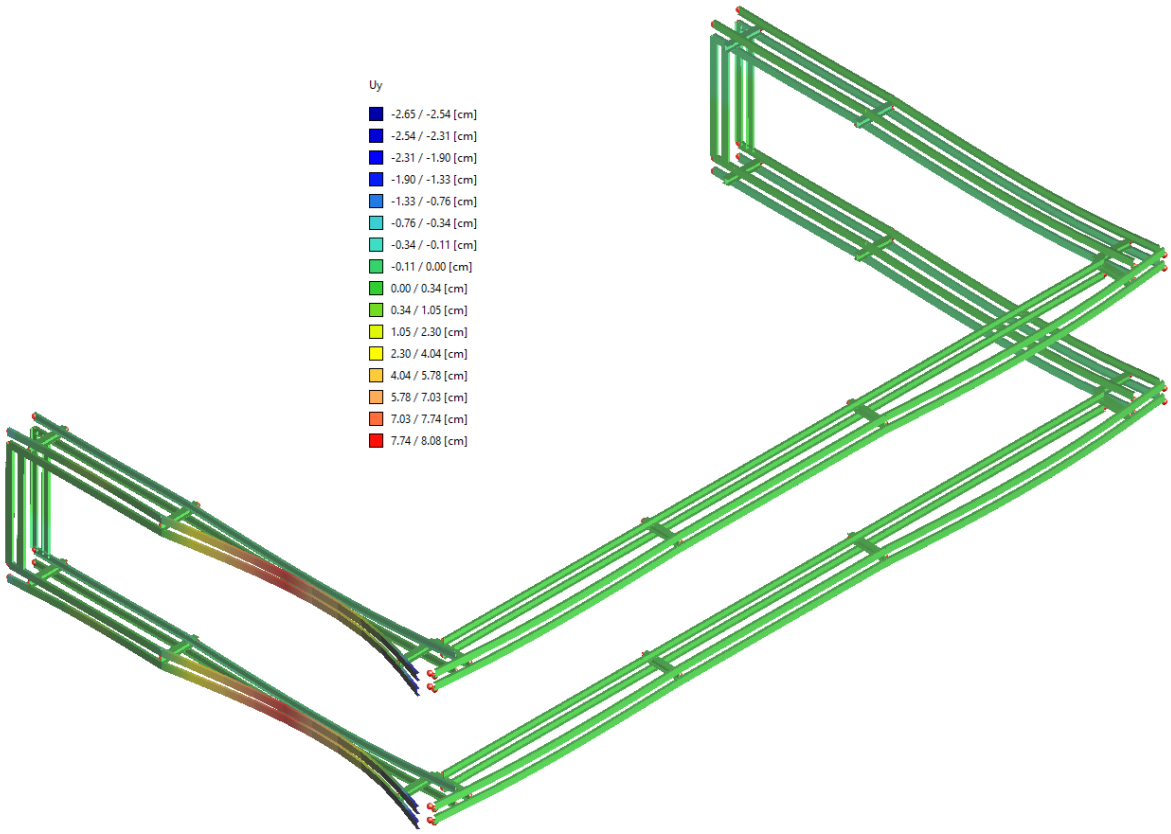

Figure 40: Deformed configuration for the seismic combination SLE Wind Y.

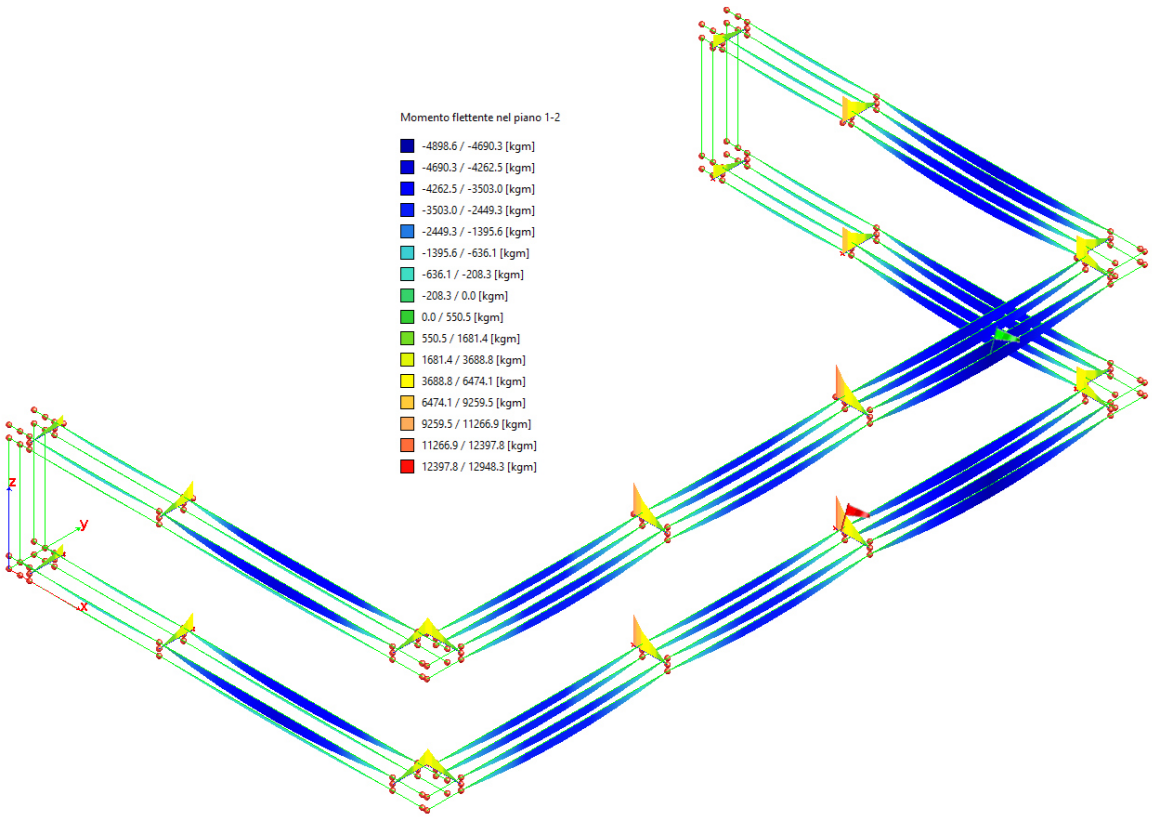

Figure 41: Diagram of the moment Mx in metal profiles, for the envelope combination.

PROPERTY OF DBA S.p.A. NOT USABLE OR REPRODUCIBLE (EVEN IN PART) WITHOUT WRITTEN CONSENT FROM DBA S.p.A.

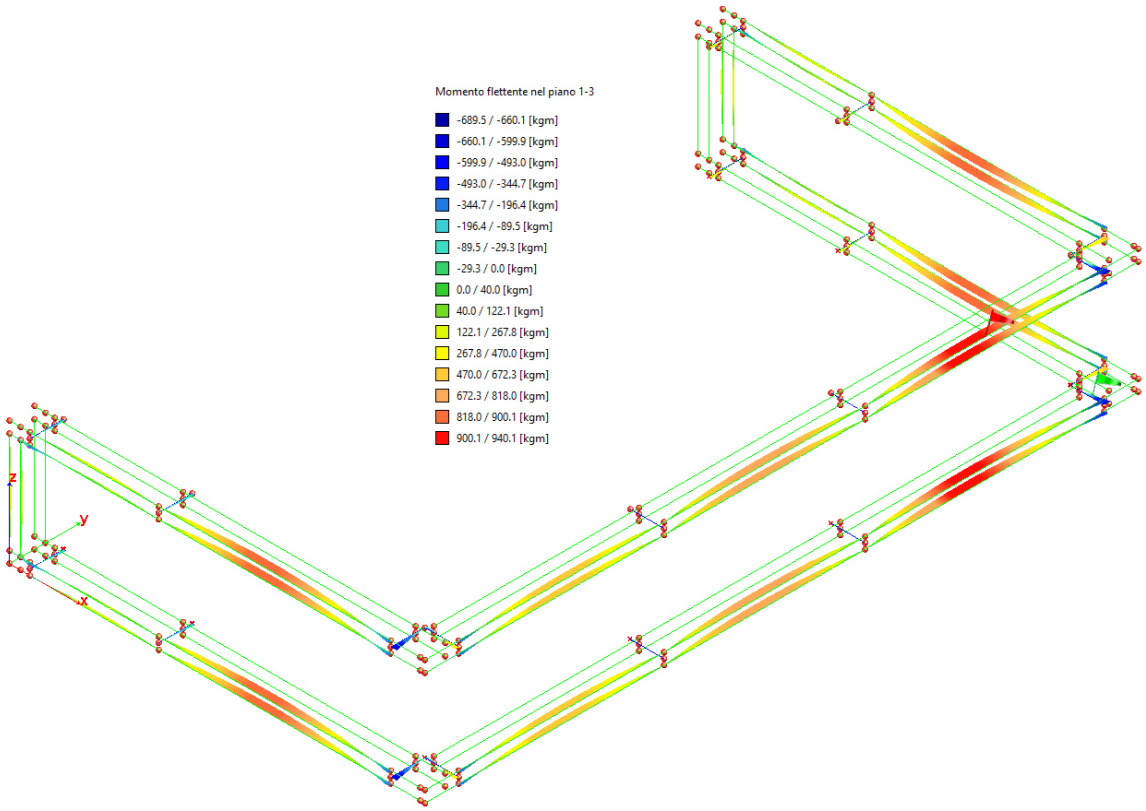

Figure 42: Diagram of the moment My in metal profiles, for the envelope combination.

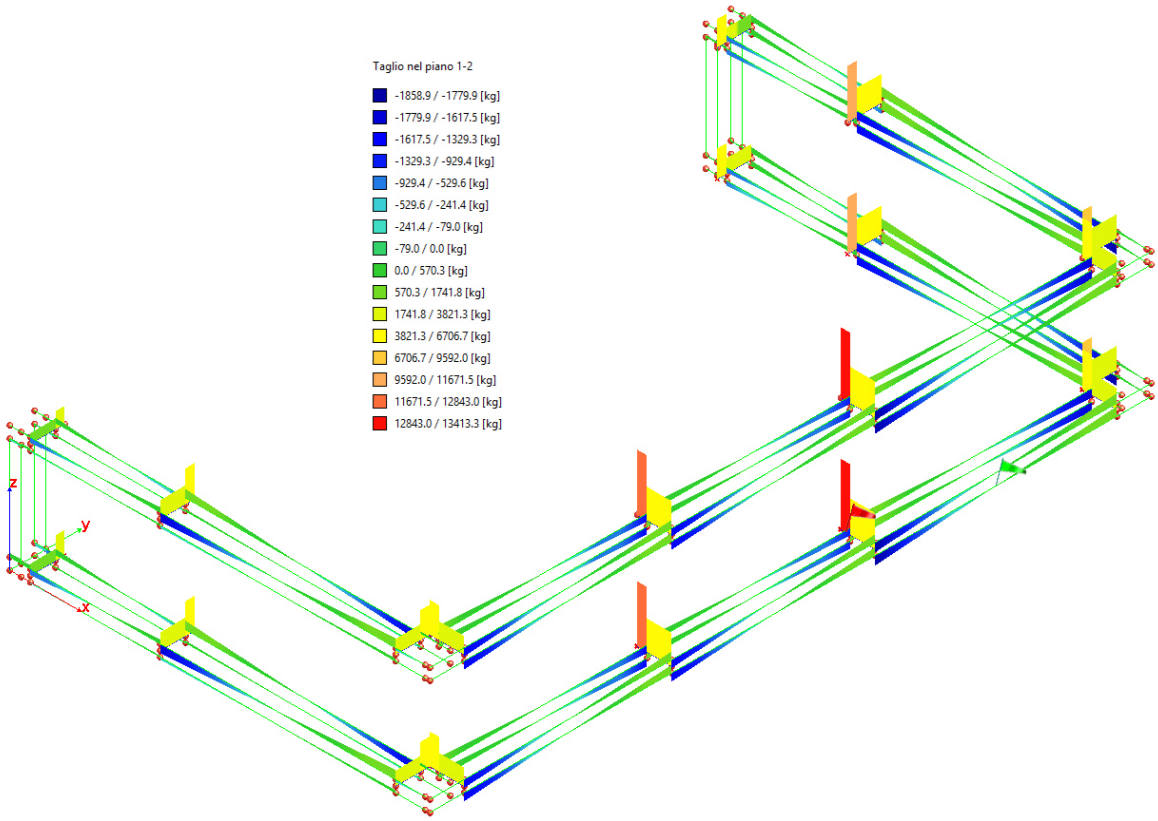

Figure 43: Diagram of the Vx cut in metal profiles, for the envelope combination.

PROPERTY OF DBA S.p.A. NOT USABLE OR REPRODUCIBLE (EVEN IN PART) WITHOUT WRITTEN CONSENT FROM DBA S.p.A.

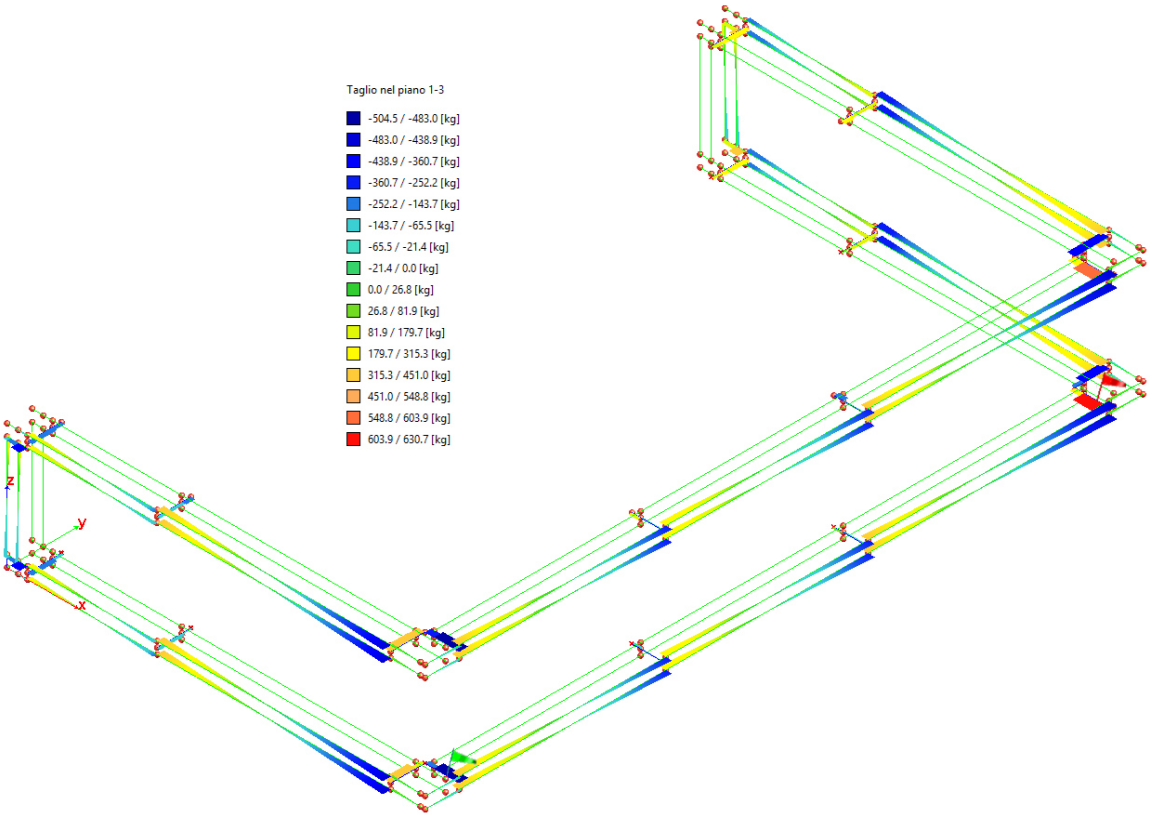

Figure 44: Diagram of Vy cut in metal profiles, for envelope combination.

PROPERTY OF DBA S.p.A. NOT USABLE OR REPRODUCIBLE (EVEN IN PART) WITHOUT WRITTEN CONSENT FROM DBA S.p.A.

2.1.5. Office entrance steel frame

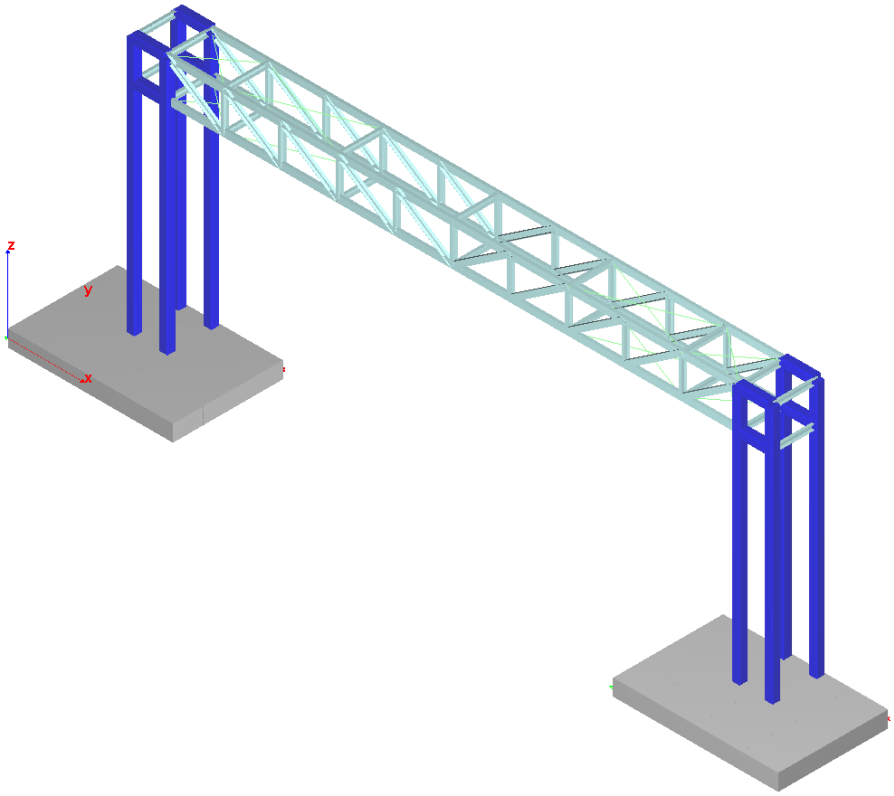

Figure 45: Three-dimensional finite element model (Solid View).

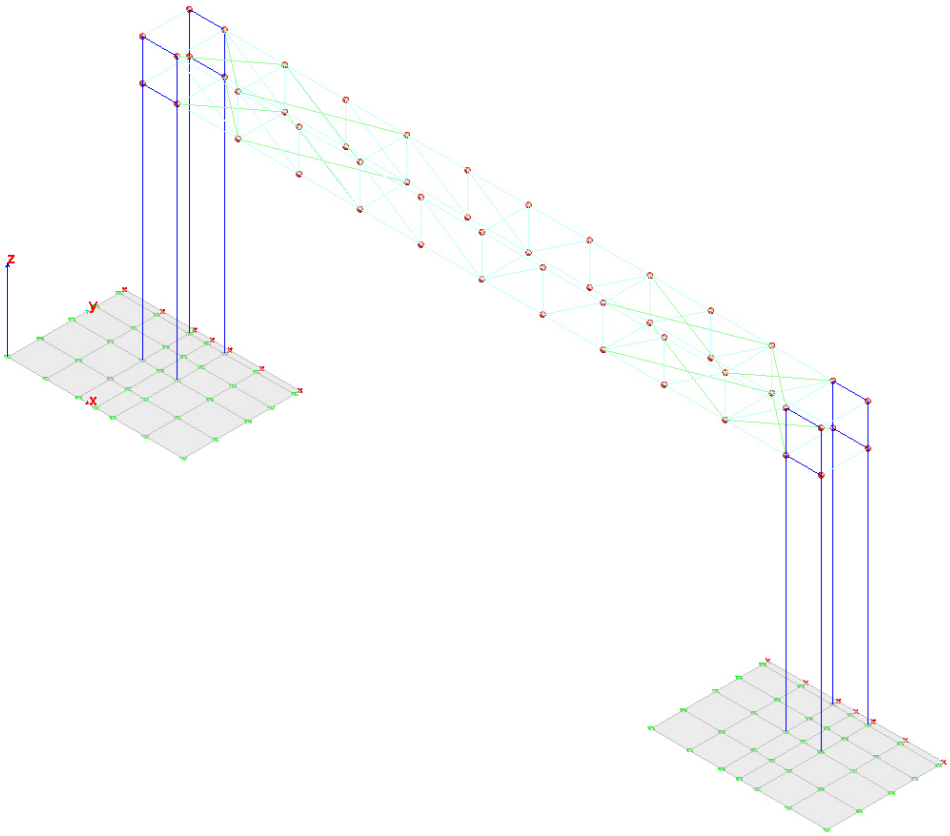

Figure 46: Three-dimensional finite element model (One-line view).

PROPERTY OF DBA S.p.A. NOT USABLE OR REPRODUCIBLE (EVEN IN PART) WITHOUT WRITTEN CONSENT FROM DBA S.p.A.

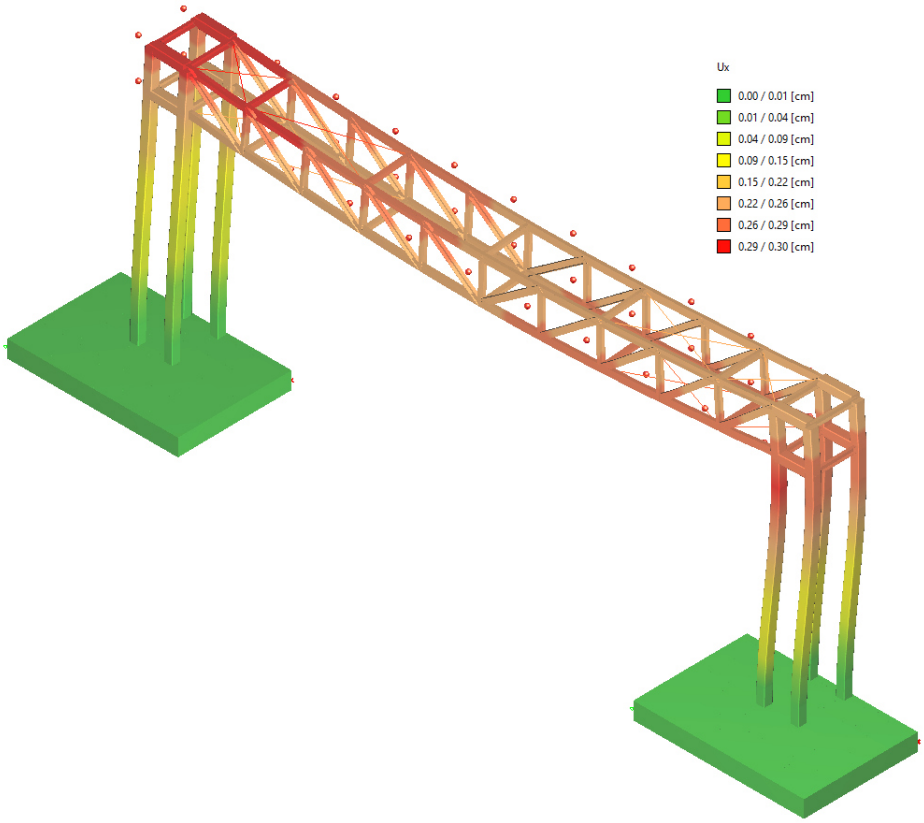

Figure 47: Warped configuration for the SLE Vento X combination.

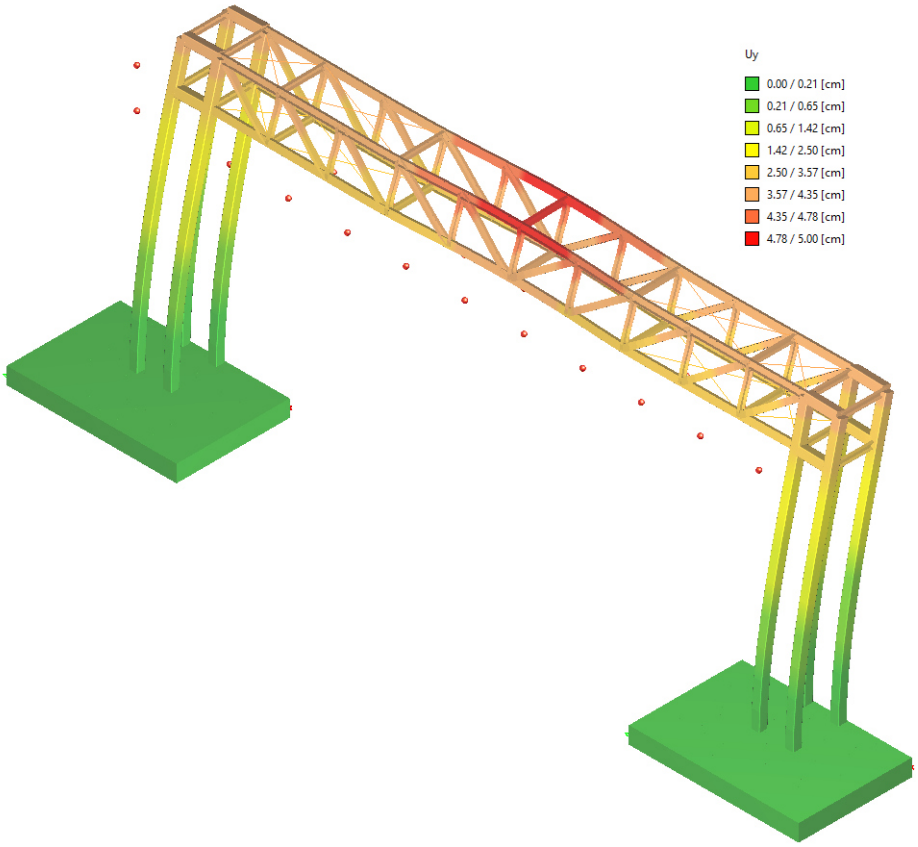

Figure 48: Deformed configuration for the seismic combination SLE Wind Y.

PROPERTY OF DBA S.p.A. NOT USABLE OR REPRODUCIBLE (EVEN IN PART) WITHOUT WRITTEN CONSENT FROM DBA S.p.A.

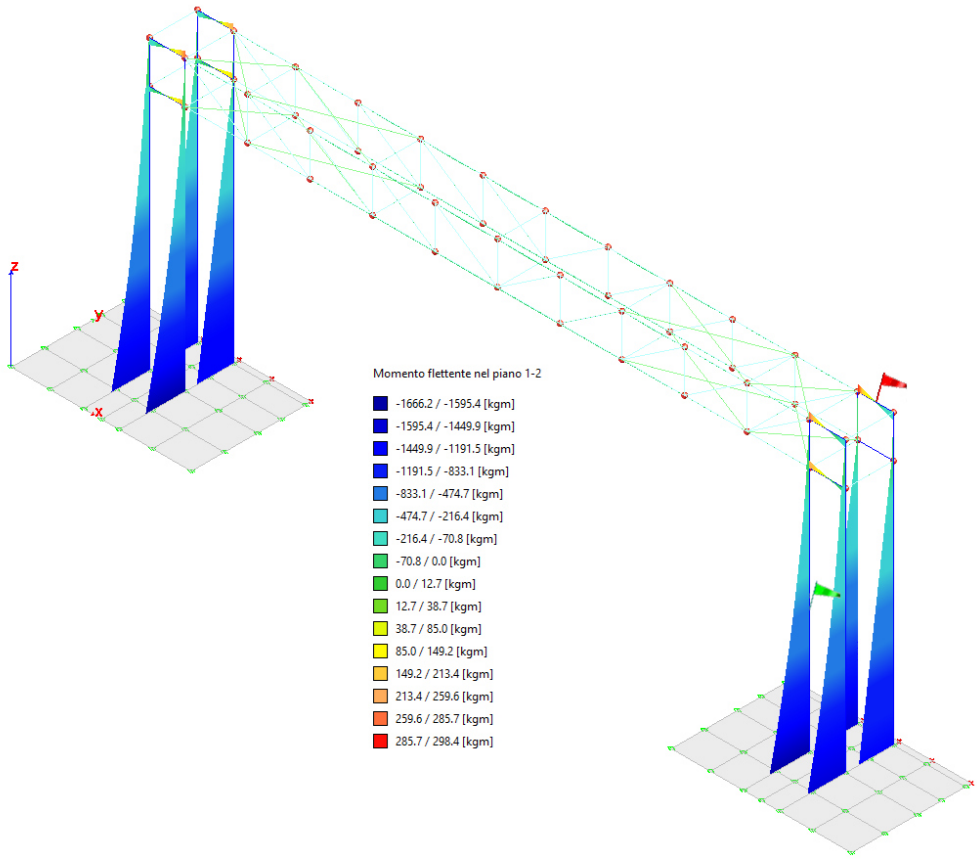

Figure 49: Diagram of the moment Mx in metal profiles, for the envelope combination.

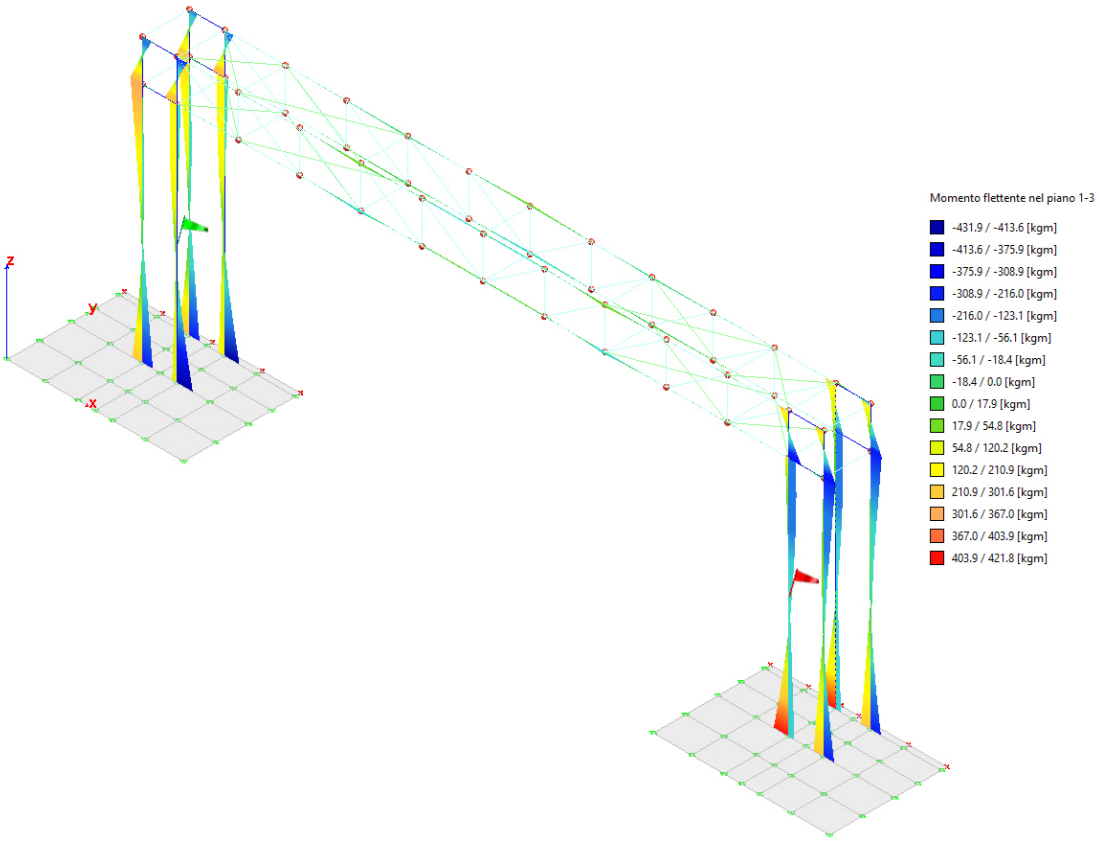

Figure 50: Diagram of the moment My in metal profiles, for the envelope combination.

PROPERTY OF DBA S.p.A. NOT USABLE OR REPRODUCIBLE (EVEN IN PART) WITHOUT WRITTEN CONSENT FROM DBA S.p.A.

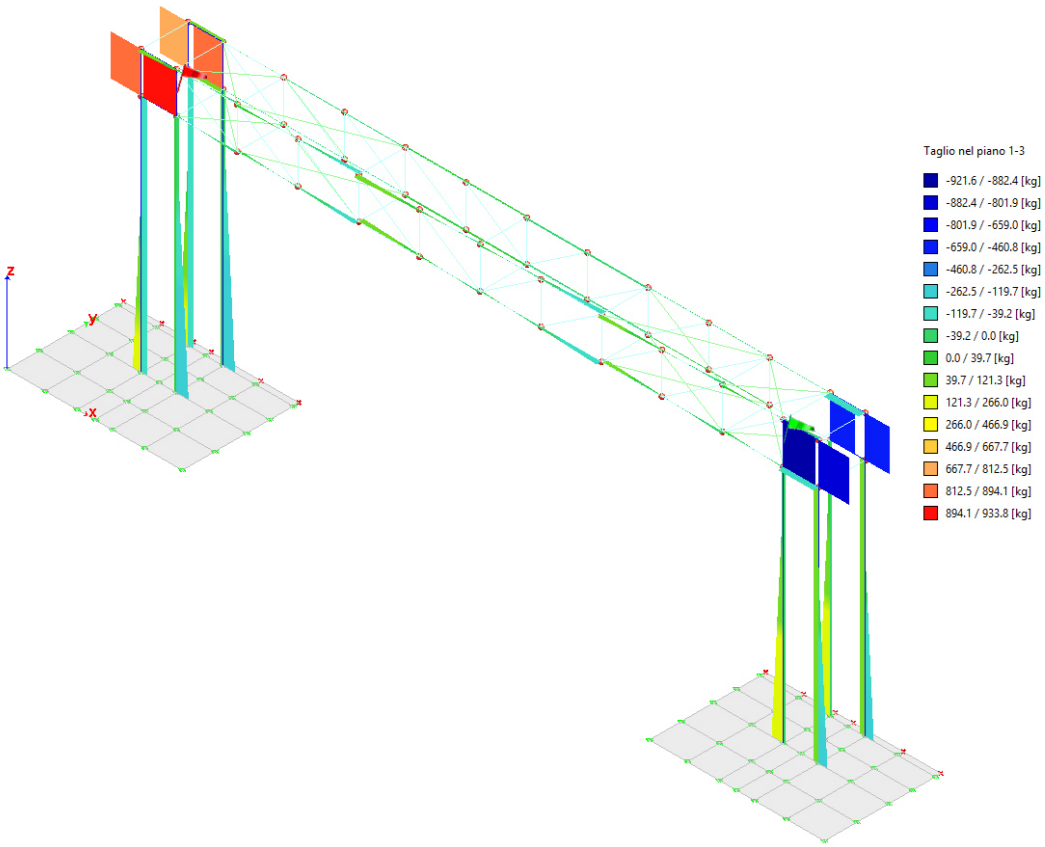

Figure 51: Diagram of the Vx cut in metal profiles, for the envelope combination.

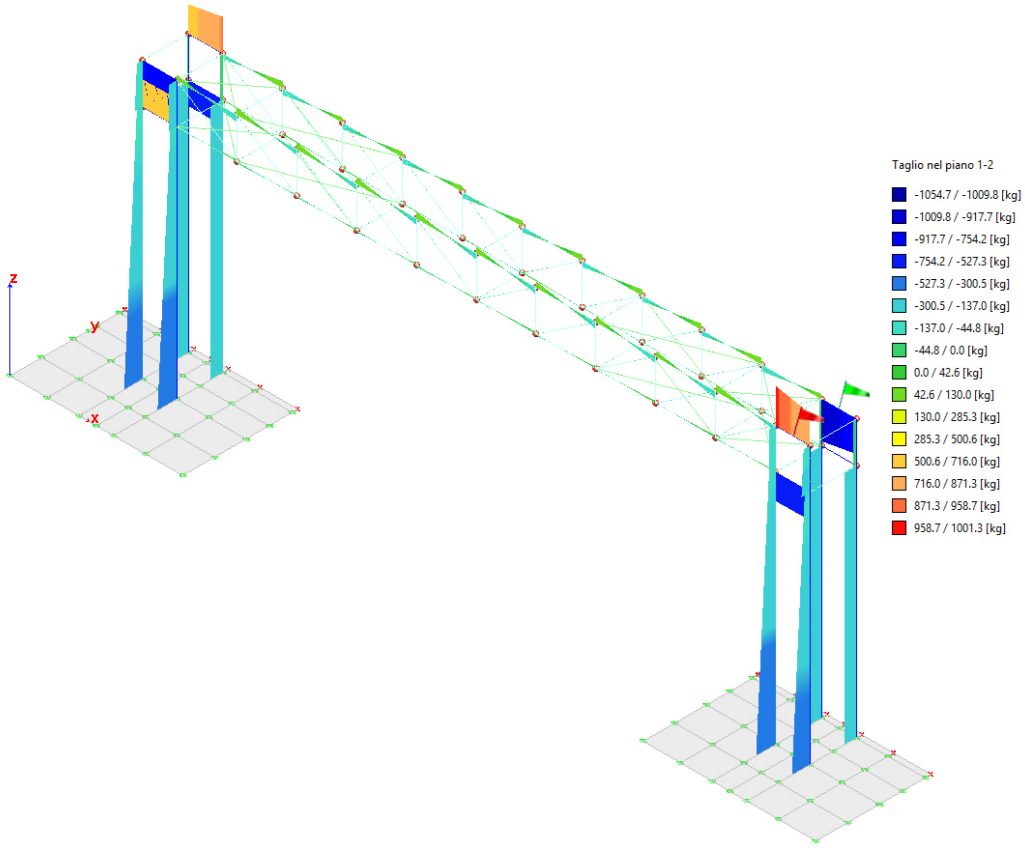

Figure 52: Diagram of Vy cut in metal profiles, for envelope combination.

PROPERTY OF DBA S.p.A. NOT USABLE OR REPRODUCIBLE (EVEN IN PART) WITHOUT WRITTEN CONSENT FROM DBA S.p.A.

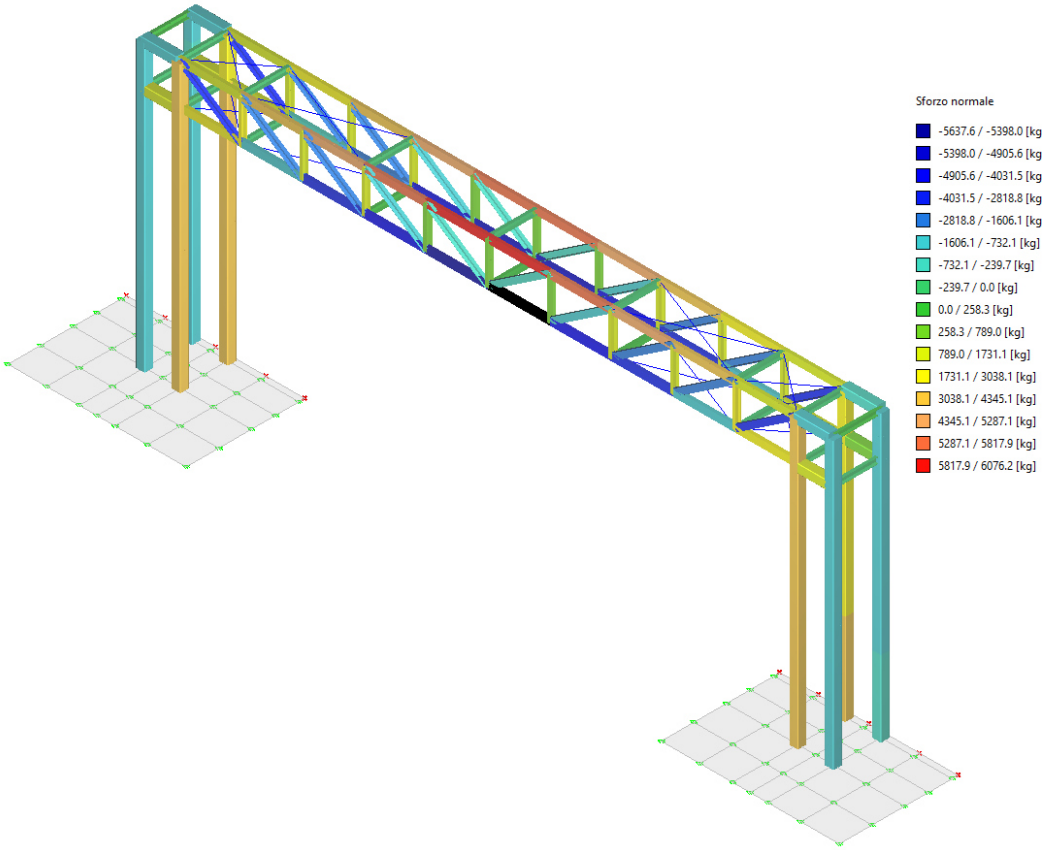

Figure 53: Diagram of the normal stress N in metal profiles, for the envelope combination.

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2.2. Stiffness Checks (RIG)

In accordance with the provisions of § 7.3.6.1 of the NTC – D.M. 17/01/2018, *the condition in terms of stiffness on the structure is considered satisfied if the consequent deformation of the structural elements does not produce damage to the non-structural elements such as to make the construction temporarily unusable.*

In the case of civil and industrial constructions, if the temporary unusability is due to excessive inter-storey displacements, this condition can be considered satisfied when the inter-storey displacements obtained from the analysis in the presence of the design seismic action corresponding to the SL and CU considered are lower than the limits indicated below.

For CUs I and II, reference is made to SLD and must be:

a) For infills rigidly connected to the structure, which interfere with the deformability of the same:

$$qd_r \leq 0{,}0050 \cdot h \qquad \textit{for fragile infills}$$

b) for infill walls designed in such a way as not to suffer damage as a result of displacements of the inter-storey d, as a result of their intrinsic deformability or of the connections to the structure:

$$q\ dr \leq d_{rp} \leq 0.0100\ h$$

where: dr is the inter-storey displacement, i.e. the difference between the displacements to the upper and lower slab, calculated according to §§ 7.3.3.3 or 7.3.4;

h is the height of the plane.

The finite element calculation code used for the structural calculation provides as a result a control option for load cases/seismic combinations of the SLD type (construction falling under use class II). The control of the movements carried out with the help of the calculation code is shown below.

<u>For CU IV, such as the one in question, reference is made to the SLO (see Table 7.3.III) and the inter-floor displacements must be less than 2/3 of the limits indicated above.</u>

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Maximum horizontal differential displacements

- Multiplication factor displacements due to the earthquake b 1
- c 1
- Control of inter-storey displacements of less than 0.0666 H

N.B. In the combinations SLD b is multiplied by q_{SLD}=1.00

Comb.	Ux		Uy	
	Nodes	Ux[cm]	Nodes	Uy[cm]
52	89-675	2.50	67-478	0.83
53	33-263	2.53	66-477	-1.18
54	89-675	2.53	66-477	1.02
55	33-263	2.51	66-477	-0.97
56	91-683	1.16	66-477	3.05
57	35-271	-1.19	66-477	3.10
58	91-683	1.21	66-477	3.53
59	35-271	-1.24	66-477	3.57
60	33-263	-2.51	66-477	0.97
61	89-675	-2.53	66-477	-1.02
62	33-263	-2.53	66-477	1.18
63	89-675	-2.50	67-478	-0.83
64	35-271	1.24	66-477	-3.57
65	91-683	-1.21	66-477	-3.53
66	35-271	1.19	66-477	-3.10
67	91-683	-1.16	66-477	-3.05

Max displacements in U direction$_x$ [cm]

Nodes	Comb.	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67
89 675	52	**2.50**	2.22	2.53	2.24	1.16	-0.27	1.21	-0.21	-2.24	-2.53	-2.22	-2.50	0.21	-1.21	0.27	-1.16
33 263	53	2.23	**2.53**	2.21	2.51	0.23	-1.19	0.18	-1.24	-2.51	-2.21	-2.53	-2.23	1.24	-0.18	1.19	-0.23
89 675	54	2.50	2.22	**2.53**	2.24	1.16	-0.27	1.21	-0.21	-2.24	-2.53	-2.22	-2.50	0.21	-1.21	0.27	-1.16
33 263	55	2.23	2.53	2.21	**2.51**	0.23	-1.19	0.18	-1.24	-2.51	-2.21	-2.53	-2.23	1.24	-0.18	1.19	-0.23
91 683	56	2.50	2.22	2.53	2.24	**1.16**	-0.26	1.21	-0.21	-2.24	-2.53	-2.22	-2.50	0.21	-1.21	0.26	-1.16
35 271	57	2.23	2.53	2.21	2.51	0.23	**-1.19**	0.18	-1.24	-2.51	-2.21	-2.53	-2.23	1.24	-0.18	1.19	-0.23

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91 683	58	2.50	2.22	2.53	2.24	1.16	-0.26	**1.21**	-0.21	-2.24	-2.53	-2.22	-2.50	0.21	-1.21	0.26	-1.16
35 271	59	2.23	2.53	2.21	2.51	0.23	-1.19	0.18	**-1.24**	-2.51	-2.21	-2.53	-2.23	1.24	-0.18	1.19	-0.23
33 263	60	2.23	2.53	2.21	2.51	0.23	-1.19	0.18	-1.24	**-2.51**	-2.21	-2.53	-2.23	1.24	-0.18	1.19	-0.23
89 675	61	2.50	2.22	2.53	2.24	1.16	-0.27	1.21	-0.21	-2.24	**-2.53**	-2.22	-2.50	0.21	-1.21	0.27	-1.16
33 263	62	2.23	2.53	2.21	2.51	0.23	-1.19	0.18	-1.24	-2.51	-2.21	**-2.53**	-2.23	1.24	-0.18	1.19	-0.23
89 675	63	2.50	2.22	2.53	2.24	1.16	-0.27	1.21	-0.21	-2.24	-2.53	-2.22	**-2.50**	0.21	-1.21	0.27	-1.16
35 271	64	2.23	2.53	2.21	2.51	0.23	-1.19	0.18	-1.24	-2.51	-2.21	-2.53	-2.23	**1.24**	-0.18	1.19	-0.23
91 683	65	2.50	2.22	2.53	2.24	1.16	-0.26	1.21	-0.21	-2.24	-2.53	-2.22	-2.50	0.21	**-1.21**	0.26	-1.16
35 271	66	2.23	2.53	2.21	2.51	0.23	-1.19	0.18	-1.24	-2.51	-2.21	-2.53	-2.23	1.24	-0.18	**1.19**	-0.23
91 683	67	2.50	2.22	2.53	2.24	1.16	-0.26	1.21	-0.21	-2.24	-2.53	-2.22	-2.50	0.21	-1.21	0.26	**-1.16**

Max displacements in the $U_{y\ direction}$ [cm]

Nodes	Comb.	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67
67 478	52	**0.83**	-0.81	0.93	-0.71	2.64	2.61	2.87	2.83	0.71	-0.93	0.81	-0.83	-2.83	-2.87	-2.61	-2.64
66 477	53	0.81	**-1.18**	1.02	-0.97	3.05	3.10	3.53	3.57	0.97	-1.02	1.18	-0.81	-3.57	-3.53	-3.10	-3.05
66 477	54	0.81	-1.18	**1.02**	-0.97	3.05	3.10	3.53	3.57	0.97	-1.02	1.18	-0.81	-3.57	-3.53	-3.10	-3.05
66 477	55	0.81	-1.18	1.02	**-0.97**	3.05	3.10	3.53	3.57	0.97	-1.02	1.18	-0.81	-3.57	-3.53	-3.10	-3.05
66 477	56	0.81	-1.18	1.02	-0.97	**3.05**	3.10	3.53	3.57	0.97	-1.02	1.18	-0.81	-3.57	-3.53	-3.10	-3.05
66 477	57	0.81	-1.18	1.02	-0.97	3.05	**3.10**	3.53	3.57	0.97	-1.02	1.18	-0.81	-3.57	-3.53	-3.10	-3.05
66 477	58	0.81	-1.18	1.02	-0.97	3.05	3.10	**3.53**	3.57	0.97	-1.02	1.18	-0.81	-3.57	-3.53	-3.10	-3.05
66 477	59	0.81	-1.18	1.02	-0.97	3.05	3.10	3.53	**3.57**	0.97	-1.02	1.18	-0.81	-3.57	-3.53	-3.10	-3.05
66 477	60	0.81	-1.18	1.02	-0.97	3.05	3.10	3.53	3.57	**0.97**	-1.02	1.18	-0.81	-3.57	-3.53	-3.10	-3.05
66 477	61	0.81	-1.18	1.02	-0.97	3.05	3.10	3.53	3.57	0.97	**-1.02**	1.18	-0.81	-3.57	-3.53	-3.10	-3.05
66 477	62	0.81	-1.18	1.02	-0.97	3.05	3.10	3.53	3.57	0.97	-1.02	**1.18**	-0.81	-3.57	-3.53	-3.10	-3.05
67 478	63	0.83	-0.81	0.93	-0.71	2.64	2.61	2.87	2.83	0.71	-0.93	0.81	**-0.83**	-2.83	-2.87	-2.61	-2.64
66 477	64	0.81	-1.18	1.02	-0.97	3.05	3.10	3.53	3.57	0.97	-1.02	1.18	-0.81	**-3.57**	-3.53	-3.10	-3.05
66 477	65	0.81	-1.18	1.02	-0.97	3.05	3.10	3.53	3.57	0.97	-1.02	1.18	-0.81	-3.57	**-3.53**	-3.10	-3.05
66 477	66	0.81	-1.18	1.02	-0.97	3.05	3.10	3.53	3.57	0.97	-1.02	1.18	-0.81	-3.57	-3.53	**-3.10**	-3.05
66 477	67	0.81	-1.18	1.02	-0.97	3.05	3.10	3.53	3.57	0.97	-1.02	1.18	-0.81	-3.57	-3.53	-3.10	**-3.05**

Maximum displacements :

Load Combination 64 Between Nodes 66 477 U_y Displacement -3.57 [cm]

No inter-storey displacements of more than 0.0666 H were detected

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2.3. Evaluation of nonlinear effects (P-Δ)

§ 7.4.6.1.2 of the Ministerial Decree of 17/01/2018 provides for a control of geometric non-linearities (P-Δ effect), by prescription: *"if θ, as defined in § 7.3.1, is > 0.1, the size of the cross-section in the direction parallel to the deflection plane must not be less than twentieth of the greater of the distances between the point where the bending moment is cancelled out and the ends of the column. This last geometric limitation does not apply when the effects of the second order are taken into account by increasing the effects of the seismic action by a factor equal to 1/(1- θ) when θ is between 0.1 and 0.2 or computed through a nonlinear analysis when θ is between 0.2 and 0.3".*

§ 7.3.1 reports the relation of the above-mentioned angle:

$$\theta = \frac{P \cdot d_{Er}}{V \cdot h} \leq 0,1$$

where:P is the total vertical load due to the horizontal structure under consideration and to the structure above it;

dEr is the average horizontal displacement of the floor at the SLV;

V is the horizontal force at the horizontal under examination;

h is the distance between the horizontal in question and the one immediately below.

<u>Evaluation of NON-Linear Effects Pd_r/Vh</u>

$Vx\ \Theta_x = P\ d_{r,x}\ /h$

$Vy\ \Theta_y = P\ d_{r,y}\ /h$

$V\ \Theta = P\ dr\ /h$ where: $dr=sqrt(d_{r,x}^{2+}dr,y^2)$

Combination control 7 .. 22

Structure factor 2.00

Importance factor γ 1.00

Calculation method: inter-floor displacements per column

Sec.	Direction 1-2								Direction 1-3							
	GDP.	Comb.	L[m]	P[kg]	V[kg]	P dr/h[kg]	dr[cm]	Θ	GDP.	Comb.	L[m]	P[kg]	V[kg]	P dr/h[kg]	dr[cm]	Θ
1	78-726	8	12.50	105642.5	155.5	14.8	-0.18	0.0955	78-726	16	12.50	105642.5	-51.5	35.5	0.42	0.6889

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2	65-474	16	10.00	61731.7	-1549.7	139.5	-2.26	0.0900	65-474	20	10.00	61731.7	1974.9	84.0	1.36	0.0425

As can be seen, the maximum parameter θ is < 0.10. **The effects of geometric nonlinearities for the main building can therefore be overlooked**.

2.4. Verification of seismic joints

The verifications of the seismic joints that separate the buildings that make up the construction are reported below, in accordance with the provisions of §7.2.1 of the NTC, in which the verification of the distance between contiguous buildings is required.

This distance must be such as to avoid hammering phenomena and in any case cannot be less than the sum of the maximum displacements determined for the SLV, calculated for each construction according to § 7.3.3 (linear analysis) or § 7.3.4 (non-linear analysis); in any case, the distance between two points facing each other cannot be less than 1/100 of the height of the points considered, measured from the foundation plane or from the top of the rigid box structure referred to in §7.2.1 of the NTC, multiplied by 2·ag· S/g ≤ 1.

If specific calculations cannot be made, the maximum displacement of a non-insulated building at the base can be estimated at 1/100 of its height, measured as above, multiplied by the addition of the S/g; in this case, the distance between contiguous buildings cannot be less than the sum of the maximum displacements of each of them.

The **10 cm joint** that separates the different buildings is checked, considering the height of the maximum construction at the height of possible hammering, measured from seismic zero and equal to 7.0 m.

The minimum distance between two points facing each other applies:

$$D_{(\min)} = \frac{H}{100} \cdot \frac{2 \cdot a_g \cdot S}{g} = \frac{700}{100} \cdot 2 \cdot 0,069 \cdot (1,0 \cdot 1,500) = 1,45 \ cm$$

Therefore, the first limitation, for which the distance between two points facing each other cannot be less than 1/100 of the share of the points considered, measured by the foundation plane, multiplied by 2·ag· S/g ≤ 1, is respected.

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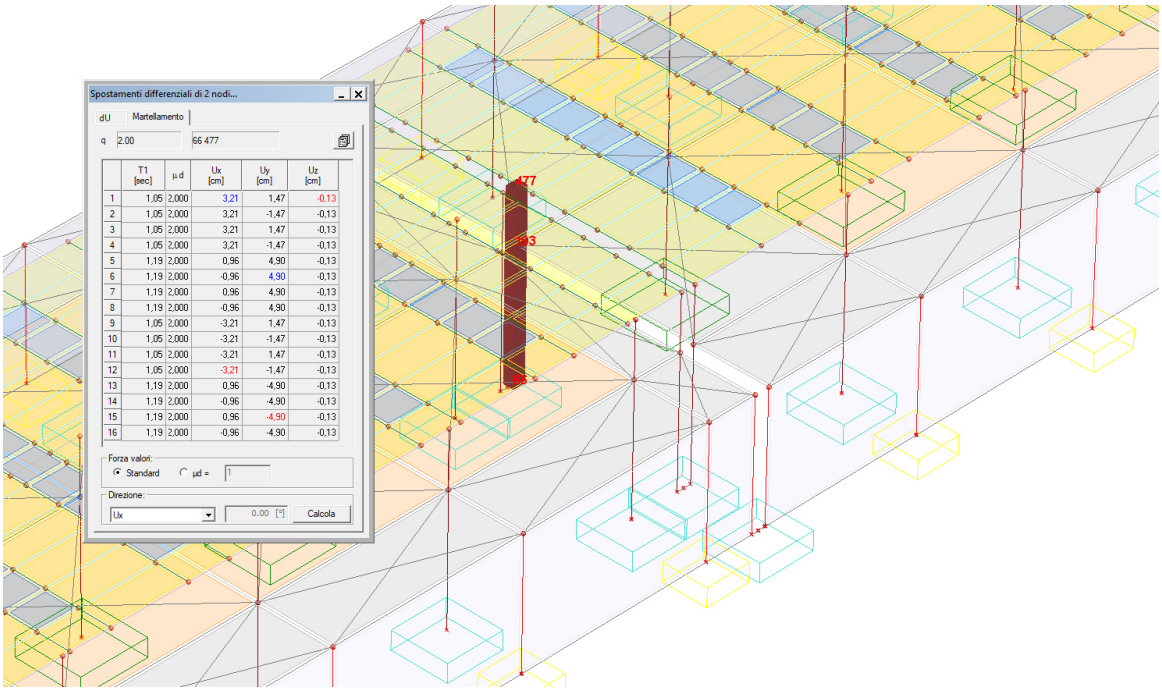
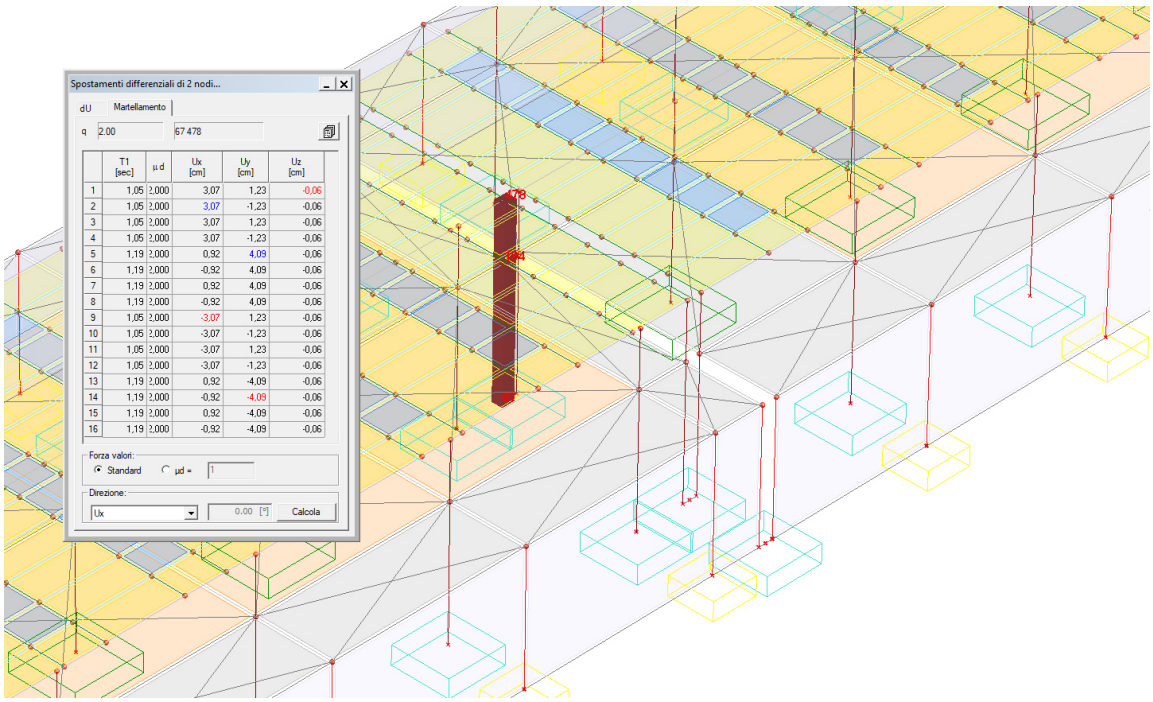
2.4.1. Seismic joint of the single-storey building

The maximum displacements in the direction and at the height of possible hammering obtained by calculation code for SLV combinations, including the amplification referred to in § 7.3.3.3 of the Ministerial Decree of 17/01/2018, are shown below.



	T1 [sec]	μ d	Ux [cm]	Uy [cm]	Uz [cm]
1	1,05	2,000	3,21	1,47	-0,13
2	1,05	2,000	3,21	-1,47	-0,13
3	1,05	2,000	3,21	1,47	-0,13
4	1,05	2,000	3,21	-1,47	-0,13
5	1,19	2,000	0,96	4,90	-0,13
6	1,19	2,000	-0,96	4,90	-0,13
7	1,19	2,000	0,96	4,90	-0,13
8	1,19	2,000	-0,96	4,90	-0,13
9	1,05	2,000	-3,21	1,47	-0,13
10	1,05	2,000	-3,21	-1,47	-0,13
11	1,05	2,000	-3,21	1,47	-0,13
12	1,05	2,000	-3,21	-1,47	-0,13
13	1,19	2,000	0,96	-4,90	-0,13
14	1,19	2,000	-0,96	-4,90	-0,13
15	1,19	2,000	0,96	-4,90	-0,13
16	1,19	2,000	-0,96	-4,90	-0,13

Figure 54: Displacements in the X direction – East Body (right = 4.90 cm).



	T1 [sec]	μ d	Ux [cm]	Uy [cm]	Uz [cm]
1	1,05	2,000	3,07	1,23	-0,06
2	1,05	2,000	3,07	-1,23	-0,06
3	1,05	2,000	3,07	1,23	-0,06
4	1,05	2,000	3,07	-1,23	-0,06
5	1,19	2,000	0,92	4,09	-0,06
6	1,19	2,000	-0,92	4,09	-0,06
7	1,19	2,000	0,92	4,09	-0,06
8	1,19	2,000	-0,92	4,09	-0,06
9	1,05	2,000	-3,07	1,23	-0,06
10	1,05	2,000	-3,07	-1,23	-0,06
11	1,05	2,000	-3,07	1,23	-0,06
12	1,05	2,000	-3,07	-1,23	-0,06
13	1,19	2,000	0,92	-4,09	-0,06
14	1,19	2,000	-0,92	-4,09	-0,06
15	1,19	2,000	0,92	-4,09	-0,06
16	1,19	2,000	-0,92	-4,09	-0,06

Figure 55: Displacements in the X direction – West Body (right = 4.09 cm).

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The sum of the maximum displacements between the buildings at the height of possible hammering is equal to:

$$U_X = U_{X,Est} + U_{X,Ovest} = 4,90 + 4,09 = 8,96 \ cm$$

lower than the size of the design seismic joint equal to th. =10 cm.

<u>The verification of the seismic joint is satisfied.</u>

2.4.2. Structural joint between the single-storey and office buildings

The maximum displacements in the direction and at the height of possible hammering obtained by calculation code for SLV combinations, including the amplification referred to in § 7.3.3.3 of the Ministerial Decree of 17/01/2018, are shown below.

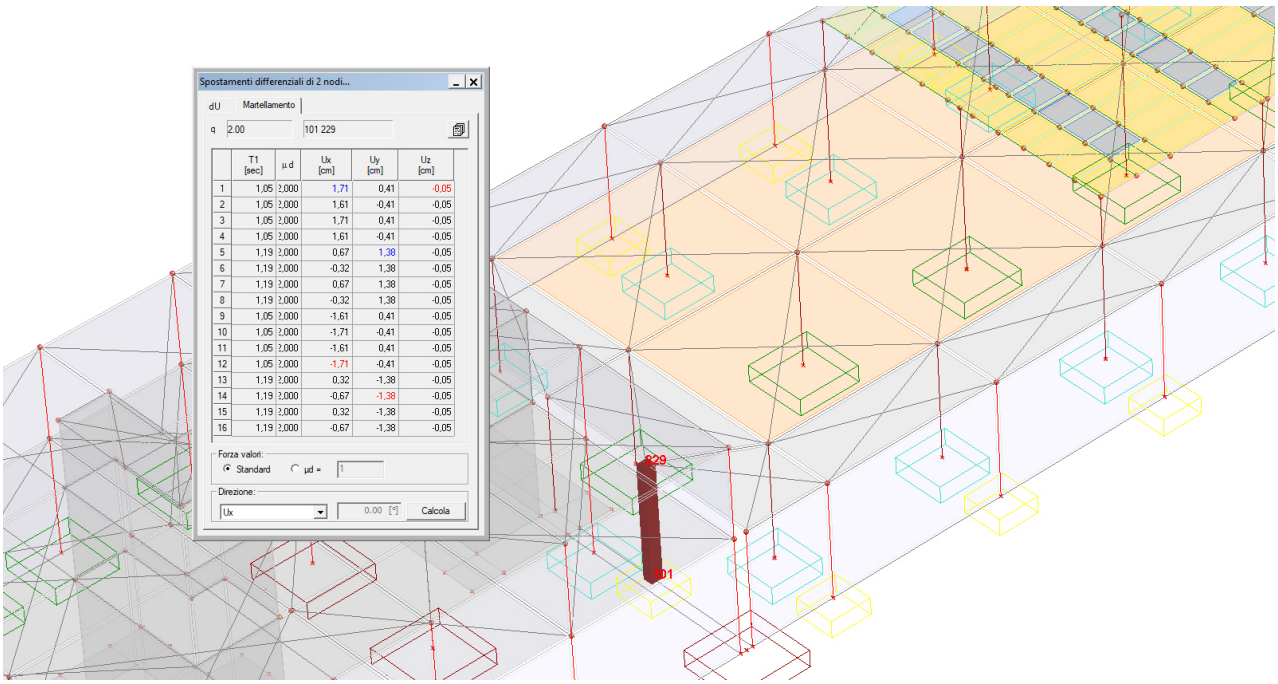

Figure 56: Displacements in the X direction – Single-storey body (right = 1.38 cm).

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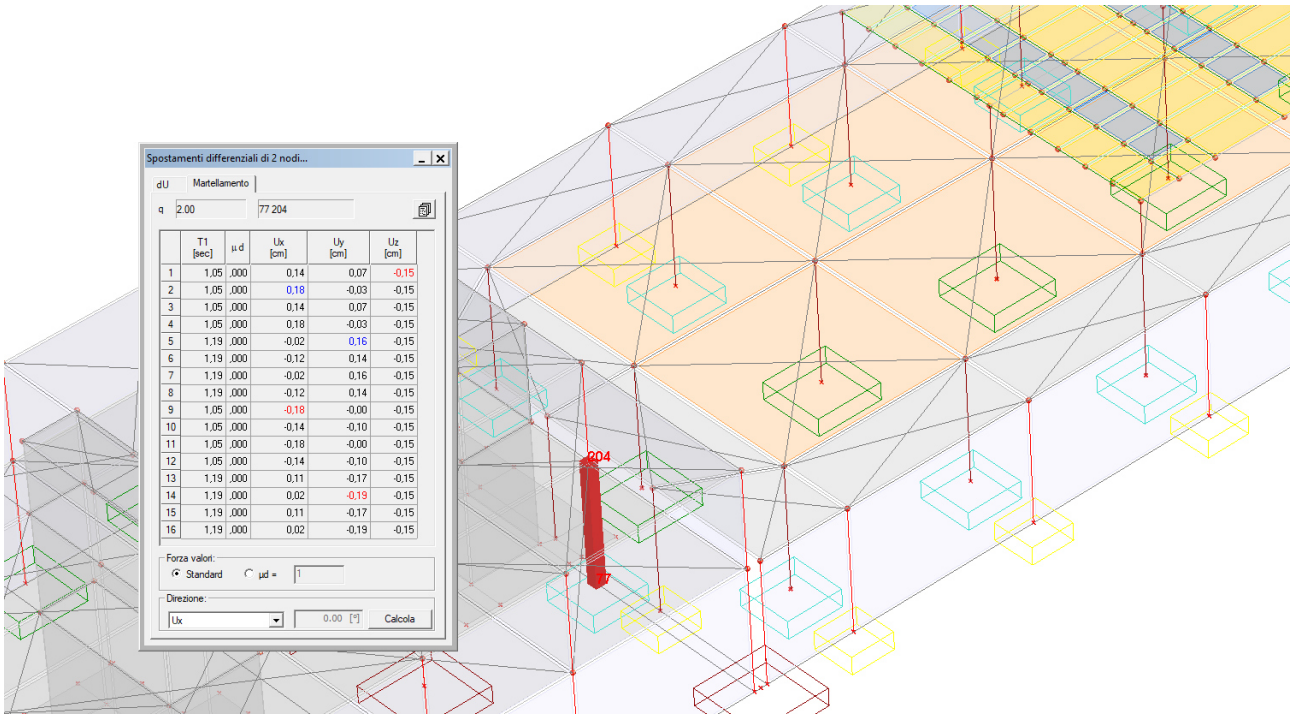

Figure 57: Movements in the X direction – Office building (right = 0.19 cm).

The sum of the maximum displacements between the buildings at the height of possible hammering is equal to:

$$U_X = U_{X,mono} + U_{X,office} = 1,38 + 0,19 = 1,57 \ cm$$

value lower than the size of the design seismic joint equal to th. =10 cm.

<u>The verification of the seismic joint is satisfied.</u>

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2.4.3. Verification of precast columns

The view of the utilization indices of the prefabricated columns with respect to the strength checks for the ULS/SLV combinations is shown below.

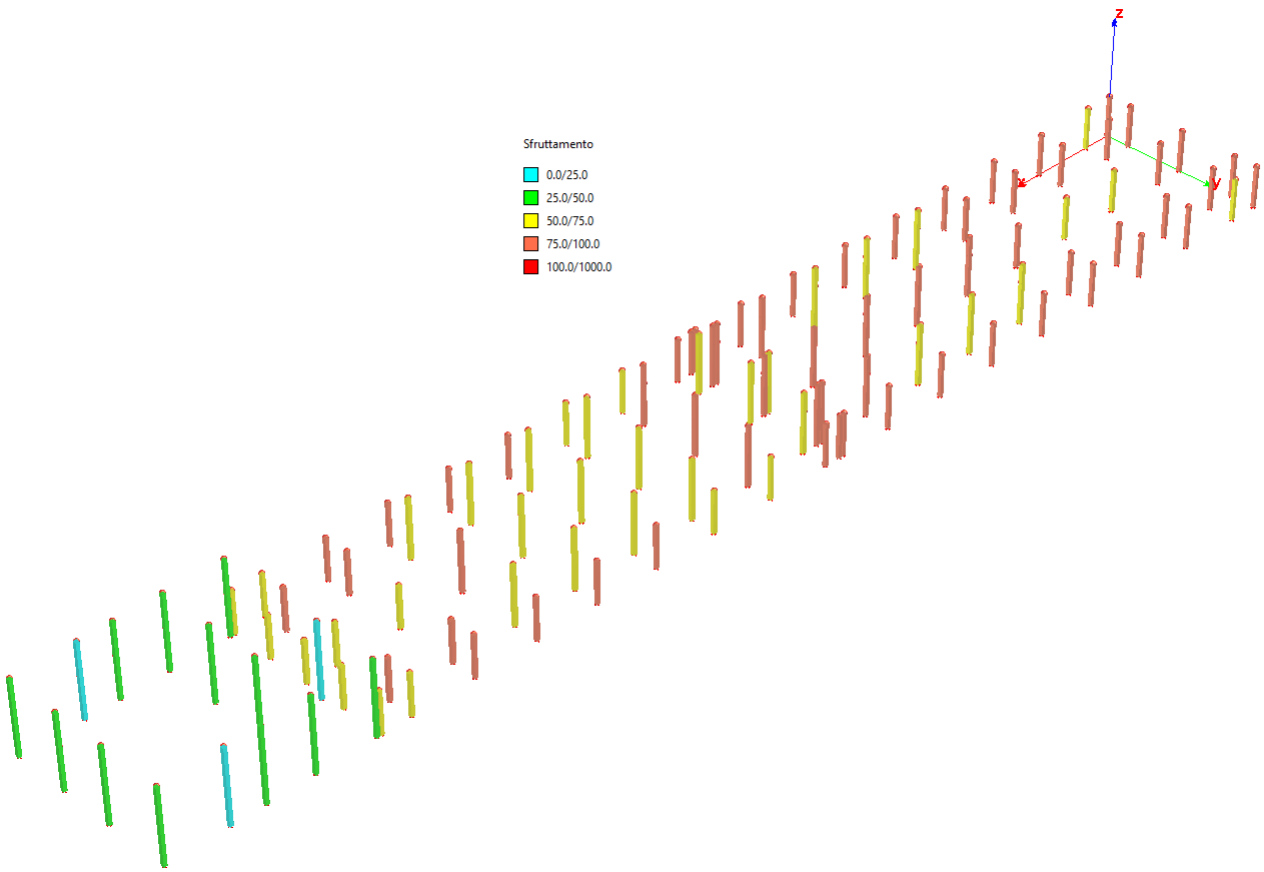

Figure 58: Utilization indices of prefabricated columns.

Element	Section	≤25%	≤50%	≤75%	≤100%	≤1000%
Pillar	1 Rect. 60x60 D.B. B 60 H 60 [cm]	6	24	10	30	0
	2 Rect. 70x60 D.B. B 70 H 60 [cm]	0	0	49	47	0

Elements at maximum SD/SR.

Element	Section	≤25%	≤50%	≤75%	≤100%	≤1000%
Pillar	1 Rect. 60x60 D.B. B 60 H 60 [cm]	125 253 (24 %)	78 205 (44 %)	115 243 (74 %)	4 130 (92 %)	
	2 Rect. 70x60 D.B. B 70 H 60 [cm]			101 229 (75 %)	67 194 (85 %)	

<u>All the checks are satisfied</u>.

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2.5. Verification of foundation plinth

The diagram of the exploitation of the foundation plinths from the calculation code is shown below.

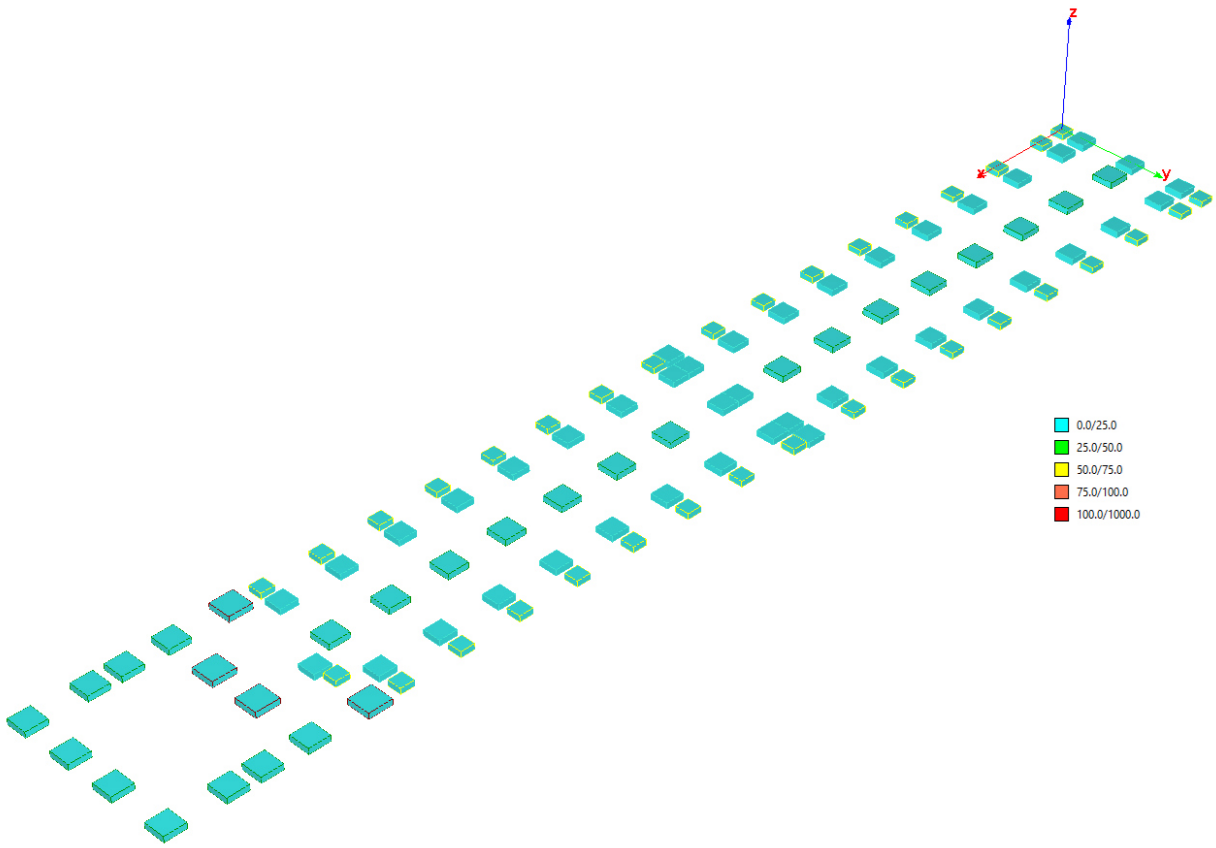

Figure 59: Diagram of the exploitation of the plinths.

All the checks are satisfied.

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2.6. Verification of the Steel Structures Forming the 'GE Area' Screens

The following shows the indices of exploitation of the steel profiles with respect to the resistance and instability checks for the ULS envelope combination.

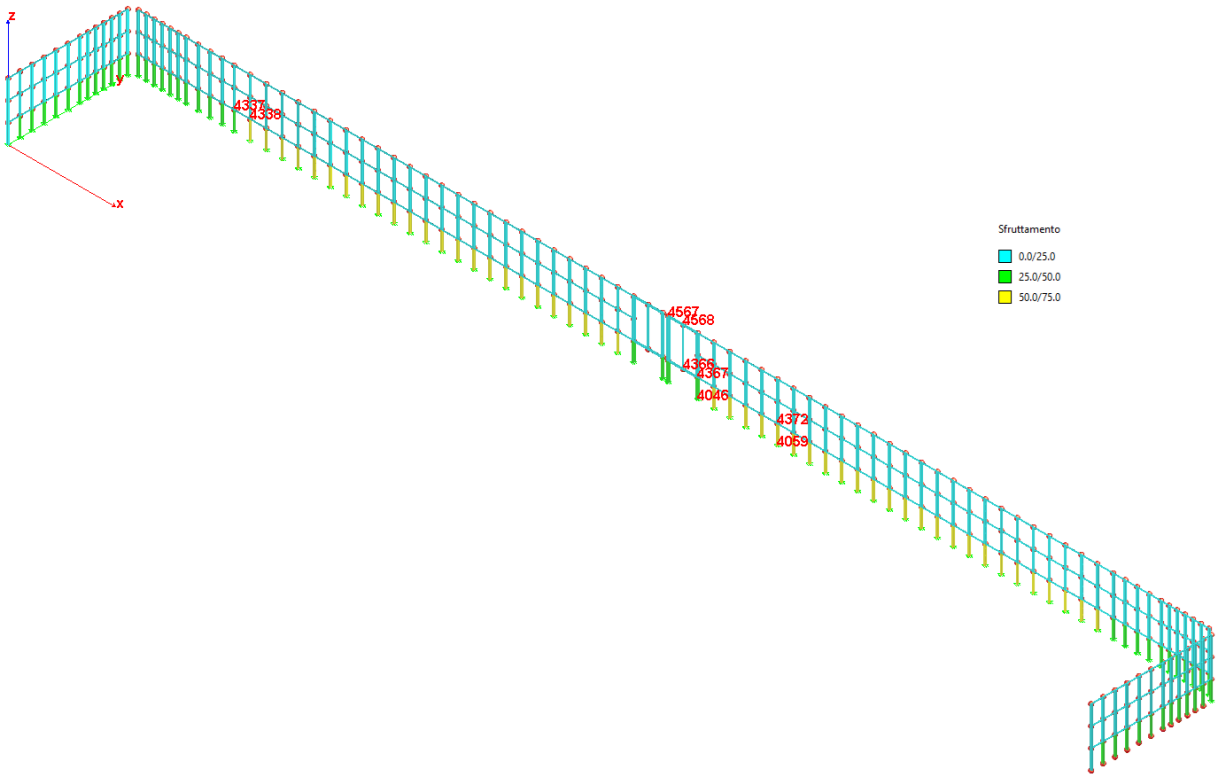

Figure 60: Exploitation indices of metal carpentry "GE Area".

Utilization rate of steel profiles

Distribution of elements (no. of elements in each field)

Column elements

SectionNumber	Sectiontype	Sd/Sr ≤ 25%	Sd/Sr ≤ 50%	Sd/Sr ≤ 75%	Sd/Sr ≤ 100%	Sd/Sr ≤ 1000%	Sd/Sr ≤ 1005%	Sd/Sr ≤ 1006%
1	HEB 260	67.35 (196)	15.81 (46)	16.84 (49)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
2	HEB 300	60.00 (6)	40.00 (4)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
3	HEA 200	100.00 (2)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)

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Beam Elements

SectionNumber	Sectiontype	Sd/Sr ≤ 25%	Sd/Sr ≤ 50%	Sd/Sr ≤ 75%	Sd/Sr ≤ 100%	Sd/Sr ≤ 1000%	Sd/Sr ≤ 1005%	Sd/Sr ≤ 1006%
1	Ret H 200x80x4.0 Tubes	100.00 (285)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
2	Square Tubes 2 220x6	100.00 (8)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)

Most stressed elements

Column elements

Section	MinNode Element	Min SD/SR	MaxNode Element	Max SD/SR
1 HEB 260	4405 4504	0.03	4059 4372	0.53
2 HEB 300	4465 4564	0.07	4046 4367	0.46
3 HEA 200	4363 4565	0.21	4366 4568	0.21

Beam Elements

Section	MinNode Element	Min SD/SR	MaxNode Element	Max SD/SR
1 Ret Tubes H 200x80x4.0	4328 4327	0.00	4338 4337	0.01
2 Square Tubes 2 220x6	4364 4363	0.11	4568 4567	0.14

<u>All the checks are satisfied</u>.

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2.7. Verification of the foundation slab – GE area

The following is the diagram of the exploitation of the foundation slab from the calculation code.

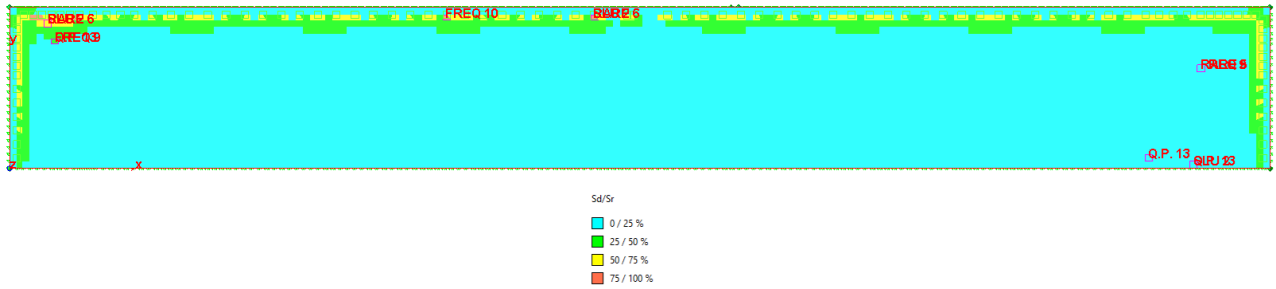

Figure 61: Diagram of the exploitation of the "GE Area" slab.

<u>All the checks are satisfied</u>.

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1.2 Verification of the Steelwork of the "Chiller Platform"

The following shows the indices of exploitation of the steel profiles with respect to the resistance and instability checks for the ULS envelope combination.

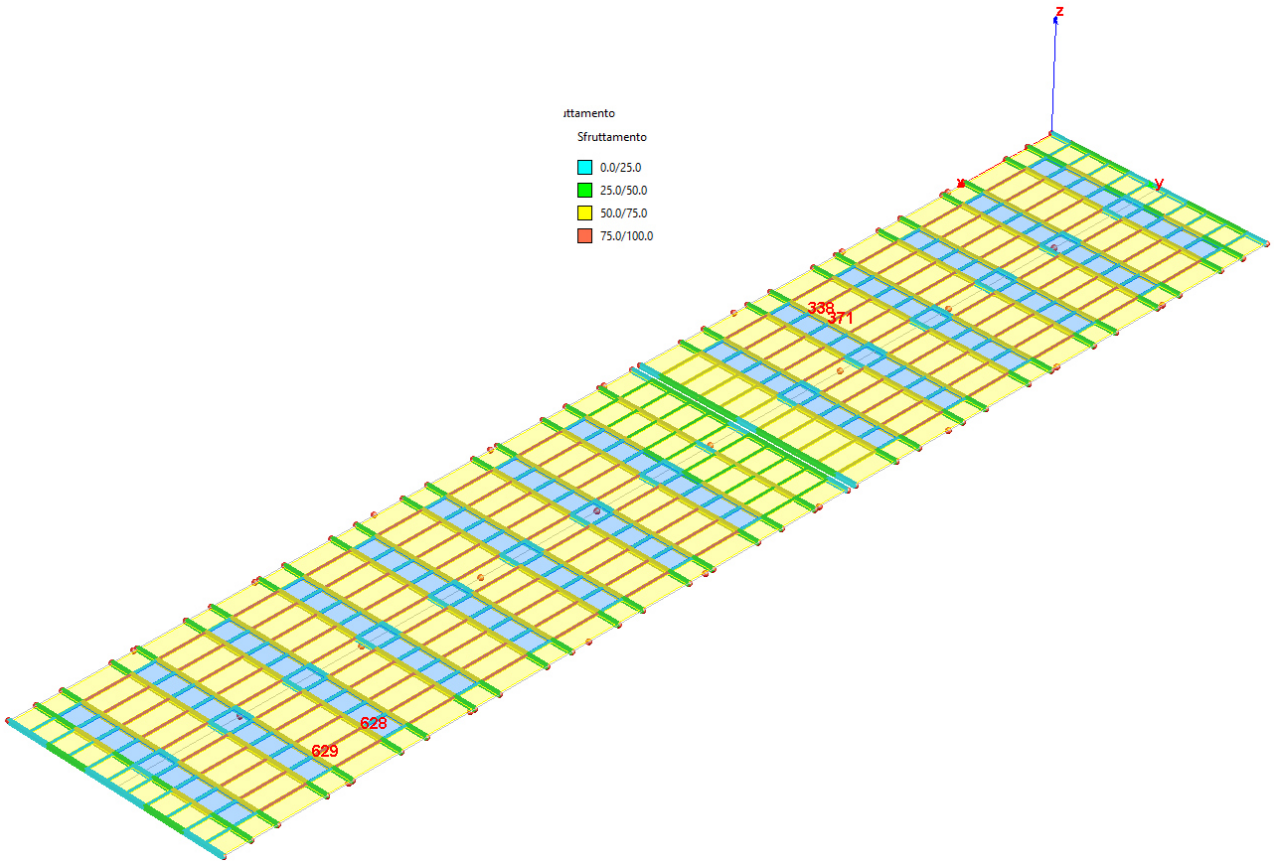

Figure 62: Exploitation indices of metal carpentry "Chiller Platform".

Utilization rate of steel profiles

Distribution of elements (no. of elements in each field)

Beam Elements

SectionNumber	Sectiontype	Sd/Sr ≤ 25%	Sd/Sr ≤ 50%	Sd/Sr ≤ 75%	Sd/Sr ≤ 100%	Sd/Sr ≤ 1000%
6	HEB 360	20.20 (80)	23.74 (94)	56.06 (222)	0.00 (0)	0.00 (0)
7	HEA 160	51.61 (160)	6.45 (20)	3.23 (10)	38.71 (120)	0.00 (0)

Most stressed elements

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Beam Elements

Section	MinNode Element	Min SD/SR	MaxNode Element	Max SD/SR
6 HEB 360	501 534	0.09	371 338	0.69
7 HEA 160	657 656	0.21	629 628	0.84

All the checks are satisfied.

2.8. Verification of the Steel Screens of the 'Chiller Platform'

The following shows the indices of exploitation of the steel profiles with respect to the resistance and instability checks for the ULS envelope combination.

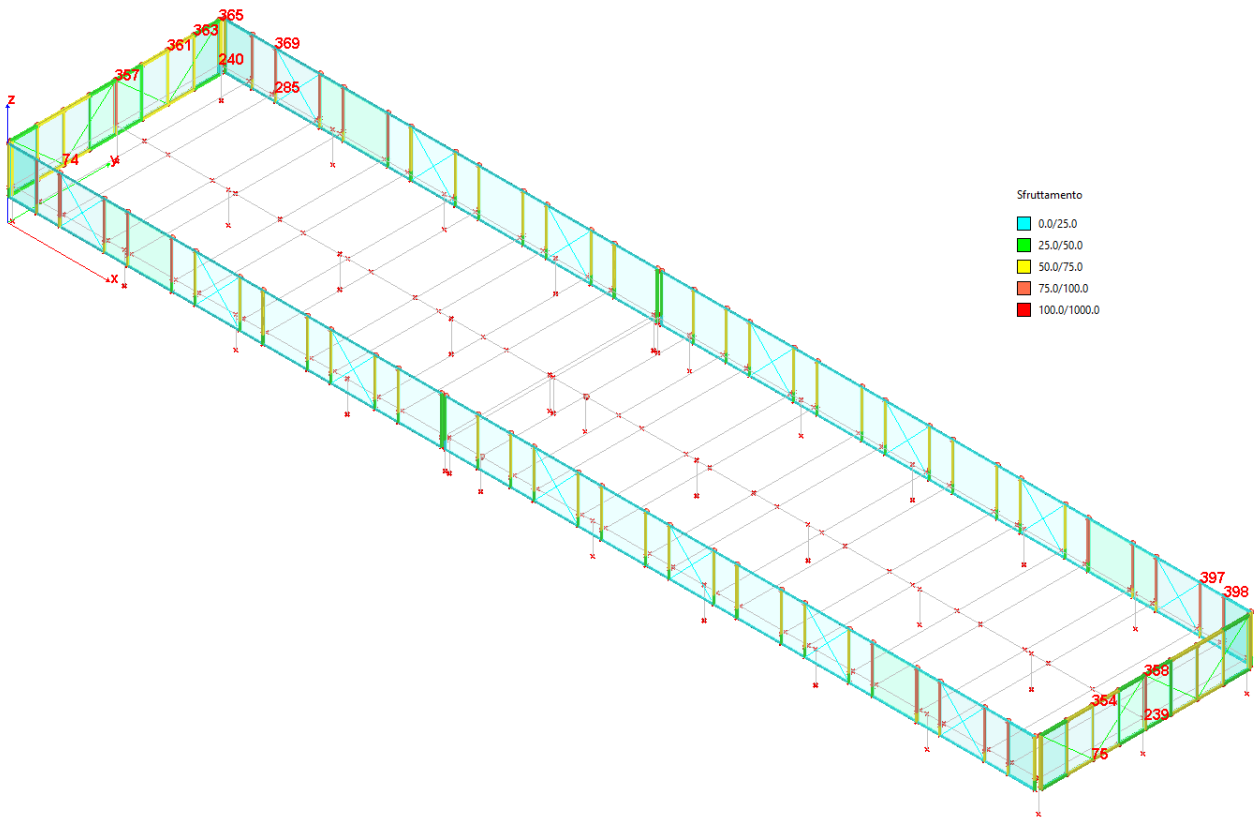

Figure 63: Exploitation indices "Chiller Platform" masking carpentry.Utilization rate of steel profiles

Distribution of elements (no. of elements in each field)

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Column elements

SectionNumber	Sectiontype	Sd/Sr ≤ 25%	Sd/Sr ≤ 50%	Sd/Sr ≤ 75%	Sd/Sr ≤ 100%	Sd/Sr ≤ 1000%
1	HEA 180	1.52 (2)	39.39 (52)	43.94 (58)	15.15 (20)	0.00 (0)
2	HEA 240	12.50 (1)	0.00 (0)	87.50 (7)	0.00 (0)	0.00 (0)
3	HEA 140	0.00 (0)	33.33 (4)	66.67 (8)	0.00 (0)	0.00 (0)
4	HEB 240	0.00 (0)	0.00 (0)	50.00 (2)	50.00 (2)	0.00 (0)

Beam Elements

SectionNumber	Sectiontype	Sd/Sr ≤ 25%	Sd/Sr ≤ 50%	Sd/Sr ≤ 75%	Sd/Sr ≤ 100%	Sd/Sr ≤ 1000%
1	HEA 220	0.00 (0)	50.00 (16)	50.00 (16)	0.00 (0)	0.00 (0)
3	Square Tubes 2 120x3	100.00 (124)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)

Connecting rod elements

SectionNumber	Sectiontype	Sd/Sr ≤ 25%	Sd/Sr ≤ 50%	Sd/Sr ≤ 75%	Sd/Sr ≤ 100%	Sd/Sr ≤ 1000%
1	Round rods ø20	77.78 (28)	22.22 (8)	0.00 (0)	0.00 (0)	0.00 (0)

Most stressed elements

Column elements

Section	MinNode Element	Min SD/SR	MaxNode Element	Max SD/SR
1 HEA 180	102 297	0.24	285 369	0.96
2 HEA 240	86 240	0.00	240 365	0.75
3 HEA 140	80 359	0.46	75 354	0.56
4 HEB 240	78 197	0.69	239 358	0.88

Beam Elements

Section	MinNode Element	Min SD/SR	MaxNode Element	Max SD/SR
1 HEA 220	84 86	0.38	361 363	0.57
3 Square Tubes 2 120x3	96 95	0.00	397 398	0.07

Connecting rod elements

Section	MinNode Element	Min SD/SR	MaxNode Element	Max SD/SR
1 Rod ø20	326 48	0.00	74 357	0.30

<u>All the checks are therefore satisfied</u>.

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2.9. Verification of the Steel Screens of the Office Façade

The following shows the indices of exploitation of the steel profiles with respect to the resistance and instability checks for the ULS envelope combination.

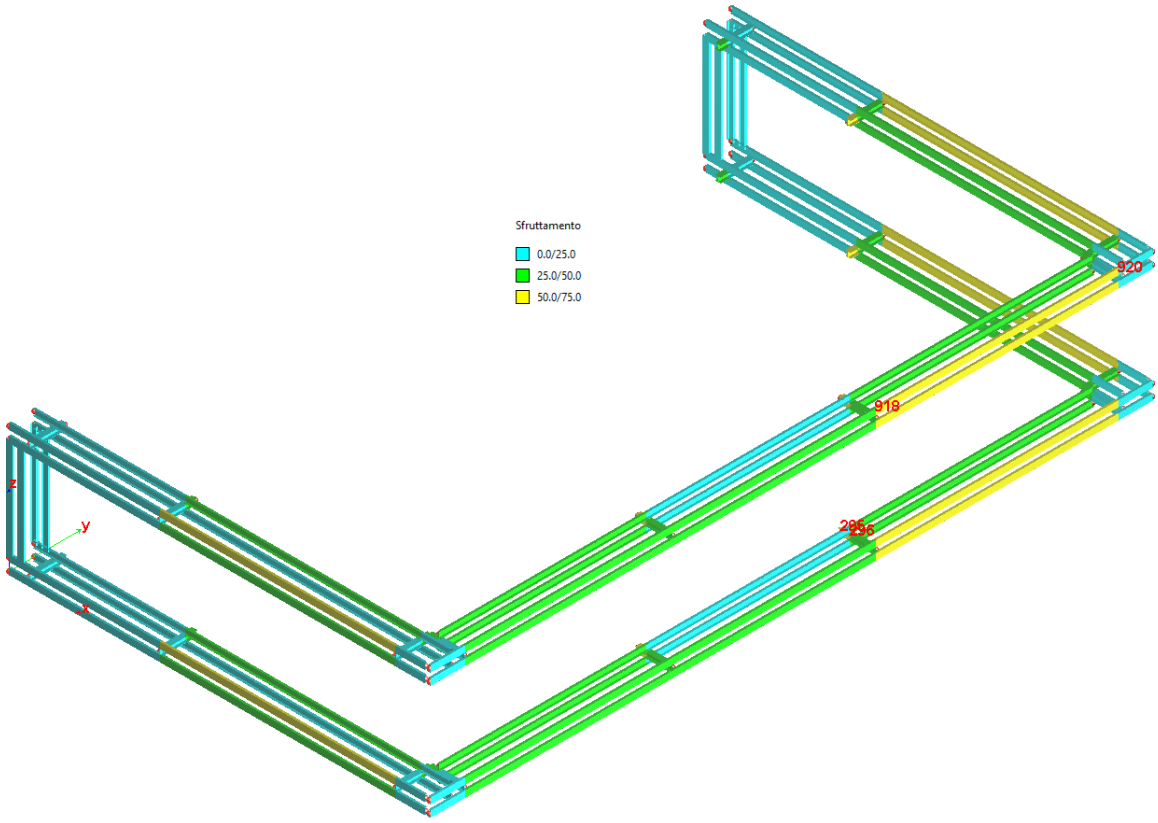

Figure 64: Utilisation indices Metal carpentry of office veils.

Utilization rate of steel profiles

Distribution of elements (no. of elements in each field)

Beam Elements

SectionNumber	Sectiontype	Sd/Sr ≤ 25%	Sd/Sr ≤ 50%	Sd/Sr ≤ 75%	Sd/Sr ≤ 100%	Sd/Sr ≤ 1000%	Sd/Sr ≤ 1005%	Sd/Sr ≤ 1006%
12	HEA 240	35.00 (14)	50.00 (20)	15.00 (6)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
13	UPN 280	71.67 (86)	20.00 (24)	8.33 (10)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)

Most stressed elements

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Beam Elements

Section	MinNode Element	Min SD/SR	MaxNode Element	Max SD/SR
12 HEA 240	875 872	0.12	295 296	0.66
13 UPN 280	372 859	0.00	920 918	0.58

All the checks are satisfied.

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2.10. Verification of the Steelwork of the Office Entrance Frame

The following shows the indices of exploitation of the steel profiles with respect to the resistance and instability checks for the ULS envelope combination.

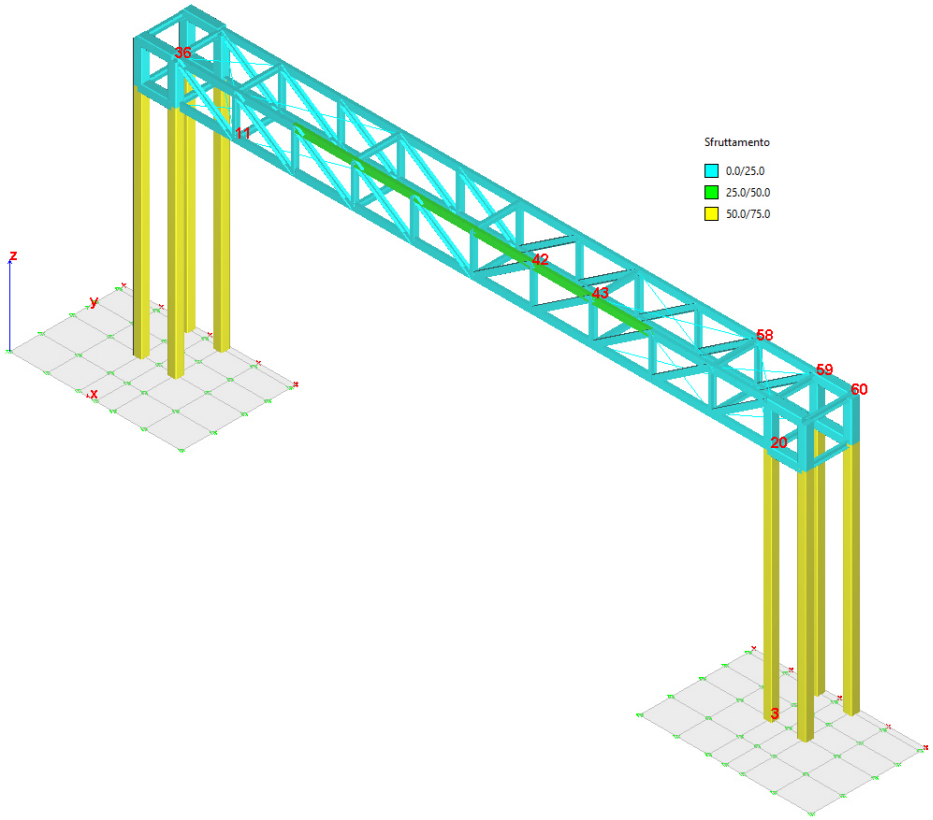

Figure 65: Exploitation indices Metal carpentry Office Portal.

Utilization rate of steel profiles

Distribution of elements (no. of elements in each field)

Column elements

SectionNumber	Sectiontype	Sd/Sr ≤ 25%	Sd/Sr ≤ 50%	Sd/Sr ≤ 75%	Sd/Sr ≤ 100%	Sd/Sr ≤ 1000%
1	Square Tubes 2 150x4	50.00 (8)	0.00 (0)	50.00 (8)	0.00 (0)	0.00 (0)

Beam Elements

SectionNumber	Sectiontype	Sd/Sr ≤ 25%	Sd/Sr ≤ 50%	Sd/Sr ≤ 75%	Sd/Sr ≤ 100%	Sd/Sr ≤ 1000%
1	UPN 120	85.00 (34)	15.00 (6)	0.00 (0)	0.00 (0)	0.00 (0)

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2	UPN 100	100.00 (56)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
3	Square Tubes 2 150x4	100.00 (8)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)

Connecting rod elements

SectionNumber	Sectiontype	Sd/Sr ≤ 25%	Sd/Sr ≤ 50%	Sd/Sr ≤ 75%	Sd/Sr ≤ 100%	Sd/Sr ≤ 1000%
1	Round bars ø12	100.00 (16)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)

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Most stressed elements

Column elements

Section	MinNode Element	Min SD/SR	MaxNode Element	Max SD/SR
1 Square Tubes 2 150x4	34 60	0.11	3 20	0.70

Beam Elements

Section	MinNode Element	Min SD/SR	MaxNode Element	Max SD/SR
1 UPN 120	50 49	0.04	42 43	0.30
2 UPN 100	46 59	0.00	36 11	0.10
3 Square Tubes 2 150x4	33 34	0.02	60 59	0.11

Connecting rod elements

Section	MinNode Element	Min SD/SR	MaxNode Element	Max SD/SR
1 ø12 rods	10 24	0.12	58 43	0.24

All the checks are therefore satisfied.

2.11. Verification of the Foundation Slabs – Office Entrance Portal

The following is the diagram of the exploitation of the foundation slabs carried out with the help of the calculation code.

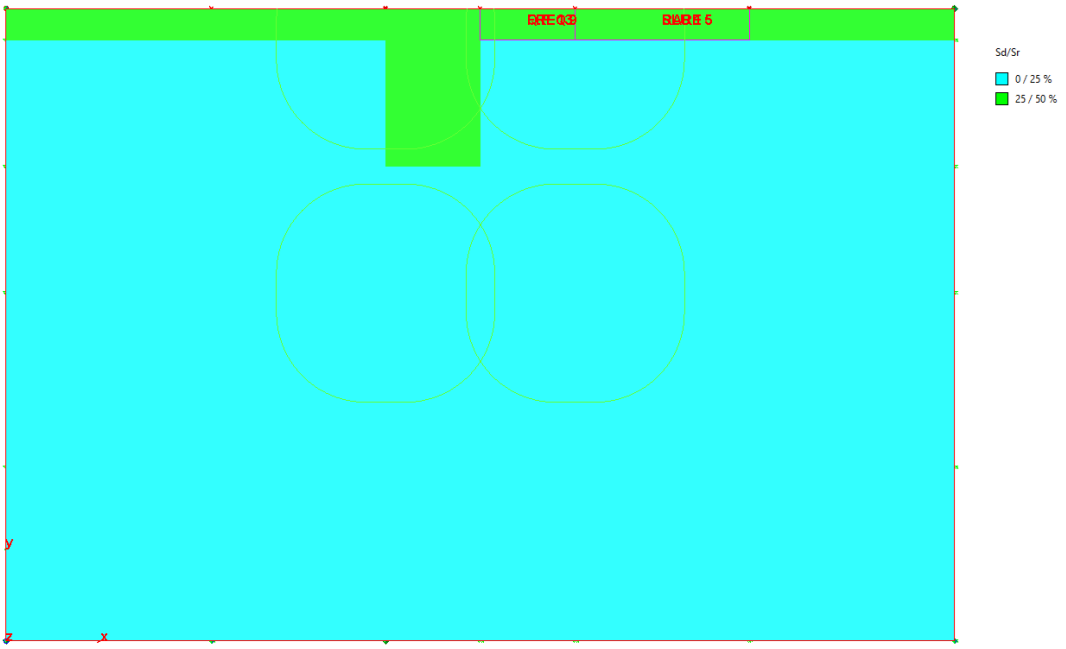

Figure 66: Diagram of the exploitation of the foundation slabs.

All the checks are satisfied.

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2.12. Conclusions

As can be seen from the checks previously reported, all the checks are satisfied.

3. CONCLUSIONS

In conclusion of this report, all structures have been verified with positive results according to technical law.

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STACK INFRASTRUCTURES

Via Lombardia 1, Siziano, Milan, Italy

MIL07

SPECIFICATIONS - STATEMENT OF REQUIREMENTS

MIL07-DBA-XX-XX-SP-S-00001

07/11/2025

Status - S4 - (Suitable for stage approval)

Project Number 13038001

Nome File: MIL07-DBA-XX-XX-SP-S-00001- Specifications - Statement of requirements.docx

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Project:	MIL 07
Site Adress:	Via Lombardia 1, Siziano, Milan, Italy
Document Title:	SPECIFICATIONS - STATEMENT OF REQUIREMENTS
Document Code:	MIL07-DBA-XX-XX-SP-S-00001
File Name:	MIL07-DBA-XX-XX-SP-S-00001- Specifications - Statement of requirements.docx
Revsion Date:	07/11/2025
Revision descritption:	P01
Purpose of Issue:	13038001
Edited by:	Ing. Giacomo Perino
Checked by:	Ing. Elvis Barattin
Approved by:	Ing. Diego Serafini

Revision History:

REV.	RED.	CONTR.	APP.	DATA	DESCRIZIONE
P01	GPE	EBA	DSE	07/11/2025	S4 – RIBA 3 Submittal

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1. General

1.1. Introduction

The document at hand concerns the Structural Statement of Requirements (SOR) for the Datacenter MIL07 of Stack in Siziano (Milan).

This means that the works to be carried out, the materials to be installed and its quality is described, but no weights, masses nor dimensions are provided.

The determination of the material quantities is to be read out from the civil, architectural and structural drawings/dimensions and is going to be established after the delivery of RIBA 3 plus design.

The realization of all described works in this report falls on the responsibility of the contractor and are to be fully included in the offer as well as all expenses from the following explanations and requirements.

Project summary:

- Project name: MIL07
- Project address: Siziano - Via Liguria - Milan, Italy.
- Owner: Stack Infrastructures.

Design Engineer (Italy):

DBA PRO SpA

Viale Felissent, 20/D

31020 Villorba (TV)

Italy

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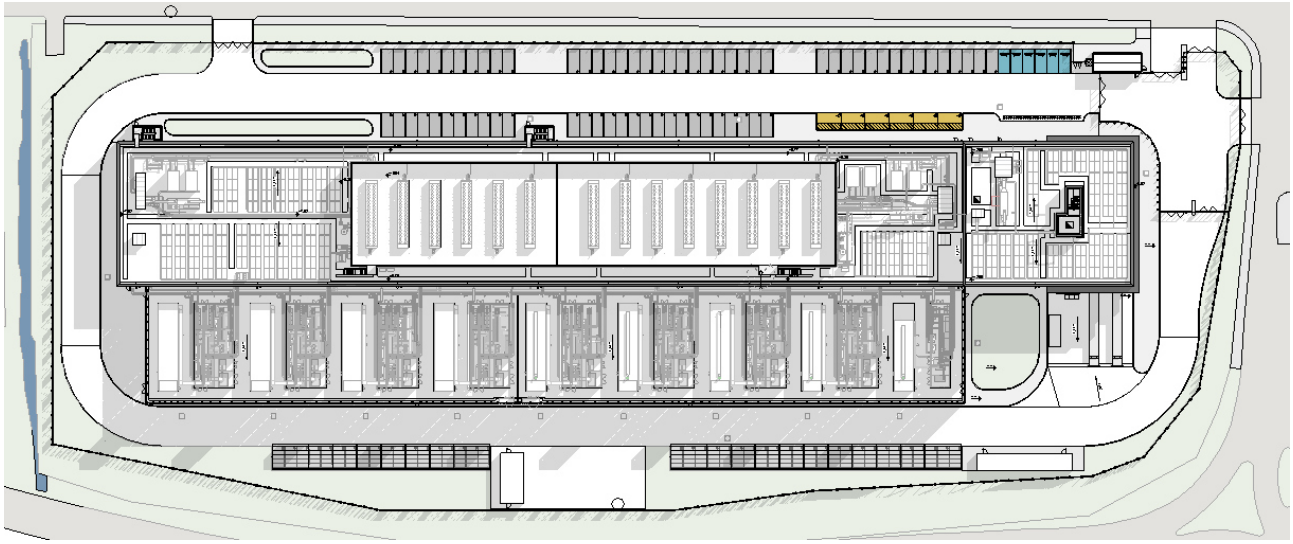
2. Project description

The construction site for the new data center MIL07 is located in Siziano (MI).

The project involves the construction of a building within the project area. A sector road network will be created which will develop crosswise along the site's boundaries to create a ring along.



Masterplan and building MIL07

The building is functionally divided in two parts. The data hall building will be one floor level high, each at 7 meters in height, with roof top equipment installed on a platform to provide airflow for proper operation.

The facility building for offices and storages is located in west part and will be two storey bulding, with staircases and elevator wells. The facility has several space designations, each that necessitates varying requirements related to interior finishes. These designations are the following:

1. Critical Spaces: Data Modules (DM's), Meet Me Rooms (MMR's), and Intermediate Distribution Frames (IDF's)
2. Essential Spaces: Power Modules, CRAH/PDU Galleries, and Battery Rooms
3. Non-Critical / Non-Essential Spaces: VDC Offices, Lobby, Flex Spaces, Customer Offices and Storage Rooms, Loading Dock, Corridor

The building dimensions are:

- Total length of the building: approx. 210 m

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- Total width of the building: approx. 30 m
- Data hall building height (up to the top of the roof): approx. 7,00 m
- Data hall building height (including roof structures): approx. 10,00 m
- Facility building height: approx. 12,00 m

2.1. Structural concept

The main structural concept of the building is summarized below:

- Foundations and floors top concrete layer: cast in site reinforced concrete
- Columns, beams, stairs, shear walls for cores and flat surface prefabricated floor slabs: precast reinforced concrete
- Roof structure (chiller platforms and walkways): hot deep galvanized structural steel
- Secondary steelworks like screens and frames: hot deep galvanized structural steel

From structural point of view, the building MIL07 is divided into thress different structures, separated by a seismic joints that involves only superstructures.

2.2. Layers

The main structural layers of the building are summarized below :

- Ground floor: foundation plinths under columns, cast in site slab 30 cm thick to link the foundation plinths. See more details on drawings
- First floor: precast concrete flat surface prefabricated slab layer 40 cm thick + cast in site slab 10 cm thick
- Roof office: precast concrete flat surface prefabricated slab layer 30 cm thick + cast in site slab 10 cm thick
- GE foundation slab: cast in site slab 40 cm thick

2.3. Foundations:

The building is to be founded on cast in place reinforced concrete plinth, that have been provided of different dimensions according to the load applied. Plinth are calculated as shallow foundation regarding the bearing capacity.

In order to reduce settlements, settlement reducing piles are designed under plinths. CFA piles Ø400mm and lenght L=10m are provided.

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The complete description and explanation of the structural concept can be found on the calculation report MIL07-DBA-XX-XX-CA-S-00001 - Structural calculations and MIL07-DBA-XX-XX-CA-S-00002 – Geotechcnical report.

The geological and hydrogeological subsoil conditions are explained and stated in the following geotechnical report:

1. Relazione geologica e allegati, Dott. Geol. Simone Scarabelli;

The used construction standards and norms together with up-to-date construction guidelines and design drawings are stated in the calculation report MIL07-DBA-XX-XX-CA-S-00001-Structural calculations and MIL07-DBA-XX-XX-CA-S-00002 – Geotechcnical report.

2.4. Technical Specifications: minimal quality requirements

These Technical Specifications define the minimal quality requirements for the structural concept, elements, components and materials. The contractor shall fulfil the minimal quality requirements as indicated in the following Technical Specifications. Furthermore, the Contractor shall fulfil all local, national (and European regulations) and the Building Permit stipulations at the moment of tendering.

2.5. Reference brand/product

Whenever a reference brand/product is specified, it serves as an indication for the quality, shape, function, finishing, etc. of the applicable system, elements, components and/or materials. The contractor is free to propose an alternative brand/product (including type) and has to prove that the quality, shape, function, finish, etc. is the same as the reference brand/product, and must have (if necessary) a “European Technical Assessment (ETA)”. Written approval on the alternative brand/product (and type) shall be given by the Employer and/or Engineer before ordering, delivery and installation by the Contractor. The contractor shall request an alternative timely in order to allow sufficient assessment time of the proposed alternative. Guarantee certificates shall be handed over to the Employer and/or Engineer.

The aforementioned shall include: CE marking certificates in case of European products (following European Regulation n° 305/2011: Construction Products Regulation, or CPR), and equivalent certificates in case of other products. The Contractor proposing the alternative brand/product shall be responsible for all costs incurred by the proposed and approved alternative except if otherwise agreed upon in writing by the Employer/Engineer.

The positioning of the described systems, elements, components and materials (Scope) in these Technical Specifications is for information only. All systems, elements, components and

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materials as shown on the drawings of the building and/or as written in the document at hand, shall be delivered and installed by the contractor(s).

2.6. Reference codes and standards

The design and realisation of the project must comply with currently recognised technical standards, product data sheets, guidelines, etc., unless explicitly described otherwise in the following documents:

- DPR n. 380/2001 Testo unico edilizia e s.m.i.
- Legge 5 novembre 1971, n. 1086 Norme per la disciplina delle opere di conglomerato cementizio armato e a struttura metallica
- D.M. 17.01.2018: "Aggiornamento NTC norme tecniche per le costruzioni".
- Circolare 21.01.2019 n. 7: "Istruzioni per l'applicazione dell'aggiornamento delle "Norme tecniche per le costruzioni" di cui al D.M. 17 gennaio 2018".
- European Regulation n° 305/2011: Construction Products Regulation
- Linee Guida per la messa in opera del calcestruzzo strutturale, Consiglio Superiore dei Lavori Pubblici, Servizio Tecnico Centrale, gennaio del 2018
- Linee Guida per la valutazione delle caratteristiche del calcestruzzo in opera, Consiglio Superiore dei Lavori Pubblici, Servizio Tecnico Centrale, gennaio 2018
- UNI 11104. Calcestruzzo - Specificazione, prestazione, produzione e conformità - Specificazioni complementari per l'applicazione della EN 206
- UNI EN 206-1: Calcestruzzo - Parte 1: Specificazione, prestazione, produzione e conformità
- UNI EN 206-9: Calcestruzzo - Parte 9: Regole complementari per il calcestruzzo auto-compattante (SCC)
- UNI EN 13670: Esecuzione di strutture di calcestruzzo
- UNI EN 12350-da 1 a 10: Prova sul calcestruzzo fresco
- UNI 11040: Calcestruzzo auto-compattante - Specifiche, caratteristiche e controlli
- UNI EN 13369: Regole comuni per prodotti prefabbricati di calcestruzzo
- UNI EN 13225: Prodotti prefabbricati di calcestruzzo - Elementi strutturali lineari
- UNI EN 1168: Prodotti prefabbricati di calcestruzzo - Lastre alveolari
- UNI EN 1536 Esecuzione di lavori geotecnici speciali - Pali trivellati

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- UNI 11763-1: Attrezzature provvisionali - Casseforme - Parte 1: Casseforme verticali - Requisiti generali per la progettazione, la costruzione e l'uso
- UNI U50.00.206.0 Casseforme – Requisiti generali per la progettazione, la costruzione, l'uso.
- UNI EN ISO 15630-1: Acciaio per calcestruzzo armato e calcestruzzo armato precompresso - Metodi di prova - Parte 1: Barre, rotoli e fili per calcestruzzo armato
- UNI EN 10080: Acciaio d'armatura per calcestruzzo - Acciaio d'armatura saldabile – Generalità
- UNI EN 998-2: Specifiche per malte per opere murarie - Parte 2: Malte da muratura
- UNI EN 771-1: Specifica per elementi per muratura - Parte 1: Elementi di laterizio per muratura
- UNI EN 771-3: Specifica per elementi per muratura - Parte 3: Elementi di calcestruzzo vibro-compresso (aggregati pesanti e leggeri) per muratura
- UNI EN 771-4: Specifica per elementi per muratura - Parte 4: Elementi di calcestruzzo aerato auto-clavato per muratura
- UNI EN 1090-1: Esecuzione di strutture di acciaio e di alluminio - Parte 1: Requisiti per la valutazione di conformità dei componenti strutturali
- UNI EN 1090-2: Esecuzione di strutture di acciaio e di alluminio - Parte 2: Requisiti tecnici per strutture di acciaio
- UNI EN 1090-3:2019: Esecuzione di strutture di acciaio e di alluminio - Parte 3: Requisiti tecnici per le strutture di alluminio
- UNI EN 15048-1: Assiemi di bulloneria strutturale non da precarico - Parte 1: Requisiti generali
- UNI EN 15048-2: Assiemi di bulloneria strutturale non da precarico - Parte 2 : Idoneità all'impiego
- UNI EN 14399-1: Assiemi di bulloneria strutturale ad alta resistenza da precarico - Parte 1: Requisiti generali
- UNI EN 14399-2: Assiemi di bulloneria strutturale ad alta resistenza da precarico - Parte 2: Idoneità al precarico
- UNI EN ISO 898-1:2013: Caratteristiche meccaniche degli elementi di collegamento di acciaio - Parte 1: Viti e viti prigioniere con classi di resistenza specificate - Filettature a passo grosso e a passo fine

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- UNI EN ISO 898-2: Caratteristiche meccaniche degli elementi di collegamento di acciaio al carbonio e acciaio legato - Parte 2: Dadi con classi di resistenza specificate - Filettatura a passo grosso e filettatura a passo fine
- UNI EN ISO 1461: Rivestimenti di zincatura per immersione a caldo su prodotti finiti ferrosi e articoli di acciaio - Specificazioni e metodi di prova
- UNI EN ISO 9224: Corrosione dei metalli e loro leghe - Corrosività di atmosfere - Valori guida per le classi di corrosività
- UNI EN ISO 10684 – Elementi di collegamento – Rivestimenti di zinco per immersione a caldo
- UNI EN ISO 14713-1: Rivestimenti di zinco - Linee guida e raccomandazioni per la protezione contro la corrosione di strutture di acciaio e di materiali ferrosi - Parte 1: Principi generali di progettazione e di resistenza alla corrosione
- UNI EN ISO 14713-2: Rivestimenti di zinco - Linee guida e raccomandazioni per la protezione contro la corrosione di strutture di acciaio e di materiali ferrosi - Parte 2: Rivestimenti di zincatura per immersione a caldo
- D.M. 16 febbraio 2007 Classificazione di resistenza al fuoco di prodotti ed elementi costruttivi di opere da costruzione
- UNI EN 1990 – EUROCODICE 0: EUROCODICE – Criteri Generali Di Progettazione Strutturale (Basis Of Structural Design)
- UNI EN 1992-1-1 – EUROCODICE 2, PARTE 1-1: Progettazione Delle Strutture Di Calcestruzzo –Regole Generali E Regole Per Gli Edifici (General Requirements For Design Of Concrete Structures)
- UNI EN 1992-1-2 – EUROCODICE 2, PARTE 1-2: Progettazione Delle Strutture Di Calcestruzzo –Regole Generali - Progettazione Strutturale Contro L'incendio (Design Of Concrete Structures In Case Of Fire)
- UNI EN 1997-1 – EUROCODICE 7, PARTE 1: Progettazione Geotecnica – Regole Generali (General Geotechnics)
- UNI EN 1998-1 – EUROCODICE 8, PARTE 1: Progettazione Delle Strutture Per La Resistenza Sismica – Regole Generali, Azioni Sismiche E Regole Per Gli Edifici (Design For Earthquake Resistance)
- UNI EN 1993-1 - EUROCODICE 3, Progettazione delle strutture di acciaio - Parte 1-1: Regole generali e regole per gli edifici
- UNI EN 1993-1-2 - EUROCODICE 3, Progettazione delle strutture di acciaio - Parte 1-2: Regole Generali - Structural fire design

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2.7. Construction/Workshop drawings and calculations

The RIBA 4 design (to be delivered in a later stage) and Building Permit Application documents will be worked out by the Engineer on behalf of the Employer. Contacts with the national and local authorities with regard to obtaining the building permit, and associated fees, will be taken care of by the Employer and/or Engineer, as well as contacts with official test laboratories.

The Contractor shall prepare all detailed workshop (production) drawings and calculations for phase RIBA 5. For documents prepared by the contractor, the contact with the authorities / municipality and the approval of these documents shall be arranged and coordinated by the contractor while informing the Employer and/or Engineer.

For phase RIBA 4, the Engineer must consider some design inputs:

1. GE and PODs structural drawings, when available, must be evaluated by the Engineer during WS4 phase, to check structural details.
2. Equipment supports on roof must be designed by the Engineer during WS4 phase.

The documents submitted with the invitation to tender are those to be further worked out by the Contractor for the execution / construction of the project. The Engineer and/or Employer will not submit any other documents to the Contractor unless otherwise stated in the document at hand.

Workshop (production) drawings and all necessary detailed calculations shall be prepared by or on behalf of the Contractor. Drawings and calculations shall be handed over in both hard and soft/digital copy format for the approval by the Employer and/or Engineer. Soft / digital copy format shall be in .dwg / .txt / .pdf.

All drawings and documents shall be provided with Stack document numbers (according to the guidelines of Stack), suitable for “BIM-360”.

RIBA 4 and workshop (production) drawings and detailed calculations include, but are not limited to:

- Reinforcement details for foundations.

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- Prefabricated concrete structures and their connection system.
- Concrete works including reinforcement drawings, tables and lists.
- Precast concrete floor and roof slab elements, including structural concrete layers and additional reinforcement.
- Anchorage for the main steel structure.
- Precast concrete stairs, platforms and lintels.
- Main and secondary steel structures, including raised steel floors and platforms, including steel grid elements.
- Critical steel temperature of steel structures and fire-resistant coating/boarding on steel structures, where needed.
- External and internal doors, door frames, and windows.
- Ventilation louvres.
- Sun shading screens and louvres.
- Sandwich panels exterior walls, including all framework and fixations structures, strips and flashings, and accompanying cassette panels
- Steel stairs, balustrades, railings, cage ladders, expanded steel sheets
- Steel safety cables on the roofs.
- Façade greening systems, including all framework and fixations structures.
- Roof structure including condensation calculations and including “green roof” materials.
- Industrial raised floors.
- Gypsum board walls and -ceilings, including framework and fixation structures.
- Internal blockwork and panel walls, including supporting and fixation structures.
- Wall views including all openings and provisions for technical installations; openings and provisions will be defined by other parties.
- Suspended ceilings.
- Floor finishing materials.
- Lifts and lifting platforms.
- Fixed furniture (Stack branding items).

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Scale of the drawings shall be minimal 1:100 and shall show lay-outs, sections, elevation views, details, finishing materials, doors and windows, stairs, balusters, platforms, (goods) lifts, fixations, sealants, etc.

Delivery and installation can only begin after approval of all necessary documents by the Employer and/or Engineer and in case applicable Authorities.

The Contractor remains responsible for the correctness of the drawings and calculations, such as materials, dimensions, numbers, regulations, loads, fire-safety, fixations, and colours, despite verification and release by the Employer and/or Engineer.

The Contractor shall indicate on the drawings all openings for technical installations and the openings for the work packages which are not in the scope of the Contractor.

2.8. Fire safety requirements

Fire safety requirements are given in the “Fire safety certificate” and the accompanying drawings of the building permit application. Fire rating and building materials specified in the document at hand are based on these documents. Where differences occur in the requirements, the highest demands shall be leading.

- All concrete structural elements shall be 60’ fire resistant, as per size and reinforcement cover, as per design.
- Structural steel profiles, where required, shall be protected with suitable fire system (fire plaster or fire-resistant panels).
- All non-structural partitions like gypsum walls or concrete blocks walls must be complaint with the fire safety requirements of this project.
- Compartmentalization of technical shafts must be complaint with the fire safety design.

3. Material specification

All products shall be CE marked, following European Regulation n° 305/2011:(Construction Products Regulation, or CPR).

On-site material checks, following Decreto Ministeriale 17 gennaio 2018 - Aggiornamento delle “Norme tecniche per le costruzioni” (NTC 2018) - Capitolo 11 “Materiali e prodotti per uso strutturale” (§ 11.1)

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4. Ground works

4.1. General

The following soil surveys/ geotechnical report have been carried out:

1. Relazione geologica e allegati, dott. geol. Simone Scarabelli;

These reports describe their fieldwork, soil and groundwater tests, analyses and recommendations for execution of earthworks, construction works, environmental soil and groundwater handling as well as foundation type.

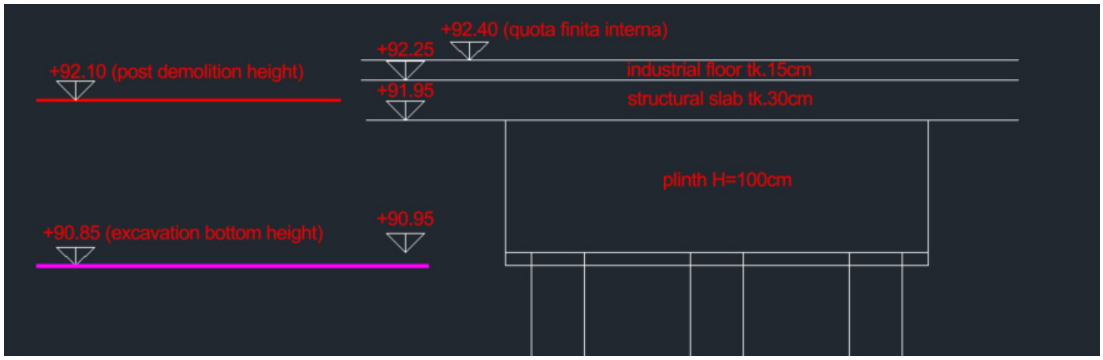
The Contractor shall be responsible of provisional works like sheet piles (if needed) on the retaining wall along he canal in the East boundary of the site.

4.2. Excavation of soil

Demolition works will be done on site, in order to remove all the existing structures.

Demolition materials will be treated on site and used to create a layer to set the site level at +92.10m.

During construction, excavation will be done on the footprint of the building to reach + 90.85m. In the following a schematic indication for the excavation.



The demarcation, earth movements (volume, area etc.). maintenance and backfilling of the construction pit, the compaction and preparation of the sole for the placement of foundation slabs, pad and lift shafts falls within the responsibility of the contractor and is to be closely discussed and approved by the geotechnical engineer and Employer. All of the above is to be fully included in the offer.

Different soil types shall be excavated and stored separately.

All artificial fillings and loam layers shall be removed up to the bearing sand/gravel layers.

Nearby existing pipes, cables, etc. excavations shall be done manually.

Excavations for pipes and cables shall be done until the bottom side of pipes and cables.

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4.3. Backfilling

After the construction of the foundation plinths, a compatted backfilling should be provided to reach +91.95m, that is the bottom level of the foundation linking slab.

The compatted backfilling should reach the following resistance charateristics:

- Deformation modulus E_{v2}>80MPa according to Frenche plate test
- Compaction ratio E_{v2} / E_{v1} < 2

Sand layer as back fill from the bottom of excavated building excavation up to the bottom of the ground floor and foundation slabs.

Return soil types that have been kept separate to their original places wherever possible.

Sand that requires delivery (in case it is not available from work activities) should have a clean soil certificate.

Note: Backfilling around the building, after completion of the building, shall be done by the sub-contractor of the Infrastructural package. In case backfilling around the building, after completion of the building, will be done by the Contractor the backfilling will be reimbursable.

See comments on the Civil Site Works Statement of Requirements and geotechnical report.

4.4. Forming and Dewatering of the construction pit

Groundwater level, measured in September 2025, is variable between -2,50 m to -1,50 m bgl.

The work in the construction pit shall be carried out in dry conditions, in order to guarantee the quality of the excavation, backfilling, gravel foundation layer, and concrete works.

Groundwater drainage with point pumping system is required for the excavations of the elevator pit and for lamination tanks, since excavation is deeper of the water level. This items will be included in the BOQ.

The Contractor shall take measures to remove and dispose soil and water in the construction pit in accordance with the applicable regulations regarding contamination and dewatering (such as groundwater drainage with point pumping system).

The costs of these provisions shall be included in the price quotation.

All measures are indicated in the geotechnical report and are to be fully included in the offer.

4.5. Waterproofing

For waterproofing details please see architectural drawings and specifications.

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5. Settlement reducing piles

5.1. General prescriptions and tests

The settlement reducing piles works shall comply with all local, National and European regulation and codes.

In general:

- Installation shall only take place when the excavation works are finished.
- Piling execution plan shall be prepared by the Contractor.

The settlement reducing piles shall be located at the required depth without any interruptions and according to the piling layout.

- The first settlement reducing pile shall be made in the surrounding of a soil investigation location / CPT (cone penetration test).
- The installation of all the piles shall be recorded and captured in a report.
- Load tests on piles should be carried out following D.M. 2018 cap. 6.4.3.7:

In agreement with the C.M. and the Inspection Manager, the following minimum number of tests are to be prepared during construction.

For the settlement reducing CFA piles D400 L=10m, the tests to be done are the following :

n° 7 compression load tests up to 1.5xQmax SLE (number of piles over 500), according to NTC2018 cap.6

n ° 45 direct or indirect integrity tests, of proven validity (at least 5% of the foundation piles), according to NTC2018 cap.6

At least the underneath summed up specifications shall be incorporated by the Contractor for foundation works. Workshop drawings and detailed calculations shall be made by the Contractor.

1.2. Settlement reducing piles

Type: cast in situ concrete settlement reducing CFA pile according to the structural design

Concrete strength class: according to structural drawings C28/35

Environment class: according to structural drawings XC2

- The piles shall be tested after the installation according to D.M. 17/01/2018 par. 6.4.3.7. (see 3.2)

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- All piles shall be measured, and deviations shall be handed over to the Employer and/or Engineer.
- Before removing the piling machine from the site, approval of the Engineer is be granted.

All necessary design on-site works and further requirements are to be added to the offer as a complete scope.

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6. Concrete works

6.1. General

General calculations for all concrete works have been prepared by the Engineer and are shown on the structural drawings including dimensions of sections which have been calculated and minimal reinforcement values.

Formwork and reinforcing schedule complete drawings shall be made by the Contractor. Execution of the cast in place concrete elements cannot proceed until the drawings are approved by the Engineer.

The following elements shall be included, calculated, dimensioned and taken care of by the Contractor:

- Structural anchors, reinforcement and provisions for expansion joints as well as building phase/module joints (e.g. rebend-connections among others) installations and architectural features shall be included in the offer.
- Waterstop joints for concrete casting.
- All elements which need to be incorporated in the concrete, have gaps, grooves and/or profiles shall be incorporated.
- Gaps, grooves and/or openings shall be made fire resistance if applicable.
- Gaps, grooves and/or openings which are not mentioned on the drawings shall only be made in close consultation with the Engineer.
- In order to prevent structural deformations during construction; supports, auxiliary structures etc. shall be applied and installed by the contractor and the provision for these considered in the offer.
- Drilling shall only take place in close coordination and approval by the Engineer.
- All repairs of concrete elements and structures shall be approved by the Engineer.
- Concrete works shall be according to local-, national regulations and European Norms.
- All concrete elements which are defined as “In-Situ” shall be finished monolithically, or as described in this document and/or the structural calculation.
- Concrete strength class according to structural calculation and drawings.
- Environmental/exposure class shall be according to structural drawings and the structural report.
- Aggregate: sand and gravel (maximum grainsize 25 mm).

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- Implement earthing provisions as indicated.
- Including galvanized steel anchors.
- Including conduits for pipes and cables, as indicated on the drawings, or included in these Technical Specifications of all other disciplines.
- Including all necessary foam tapes / strips and joint sealants.
- Inside of concrete walls shall be finished as fair faced.
- All temporary struts and supports shall be assured by the Contractor.

Scope:

- Foundation structures of the building and external GE yard. All cast in situ concrete works.

6.2. Concrete Blinding

- Blinding for reinforced concrete structures class C12/15
- Environmental class: according to structural drawings and reports
- Reinforcement: no reinforcement
- Binding agent: cement
- Aggregate: sand and gravel
- Thickness: 100mm, as indicated in the drawings
- Materials specifications and certificates of origin shall be handed over to Employer and/or Engineer
- Concrete surface: flat.

Scope:

- Concrete blinding for all foundations of the building and the outside elements.

6.3. Structural In-situ reinforced concrete

- All concrete structural elements shall be 60' fire resistant, as per size and reinforcement cover, as per design.
- Concrete strength class according to structural drawings.
- Environmental class shall be according to structural drawings, reports and the geotechnical reports.

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- Aggregate: sand and gravel (maximum grainsize according to structural reports).
- Floor slabs shall be finished monolithically according to relevant regulations and standards.

  Including hard gravel top-layer additives in case necessary to obtain strength class.
- Implement earthing provisions as indicated.
- Including galvanized steel anchors for steel structures and starter bars for precast structures.
- Including conduits for pipes and cables, as indicated on the drawings, or included in these technical specifications.
- Concrete foundation slab, foundations walls and ground floor slab shall be connected watertight till highest flood level.
- Including all necessary foam tapes / strips and joint sealants.
- Inside of concrete walls shall be finished as fair faced.
- Reinforcement quantities according to structural reports.
- Pouring breaks to be checked by the Engineer.

Scope:

- Foundation and ground floor structures of the building and the outside elements.

6.4. Concrete

Due to the high requirements (e.g. load, constructability etc.) and boundary conditions no recycling concrete is to be used. The minimal concrete and aggregate requirements are to be compliant to UNI 11104 and UNI EN 206-1

- Min. strength C30/37.
- Cement CEM II 32.5R following UNI EN 197-1:2011,
- Maximal 340 kg/m^3.
- Maximum grain size: according to structural reports Fuller particle size curve following UNI EN 933-1.
- Lower grain sizes (8 – 16 mm for deep beams).

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All additives, installations and measures which are needed to reach the required concrete quality as well as the in-situ production and transportation (pumped concrete) strategy chosen by the contractor is to be included in the offer. Further measures like the application of antifreeze, has to be included in the calculation and will not be compensated at a later stage.

If the required quality of the concrete and its surface is not reached on the wall base area (e.g. gravel pockets, missing parts, etc.) a finer aggregate concrete is to be used for the base, especially for deep beams. Fine aggregate concrete is also to be used where the amount of reinforcement has a reduced spacing (<25mm). This measure is to be included in the offer.

6.5. Structural concrete layers on prefabricated floor slabs

Structural reinforced concrete layers on the flat lower surface slab and precast concrete massive floor slabs shall be poured after all joints have been filled with the appropriate infill.

Joints on the underside/soffit of pre-cast concrete floor slabs shall be filled with appropriate joint filling material.

Flatness of the concrete layer shall be according to on architectural SoR.

Joints shall be finished to expose v-joints on underside of slab.

All structural layers on top of the flat lower surface slab and precast concrete slabs shall be finished monolithically according to relevant regulations and standards.

Including hard gravel top-layer additives in case necessary to obtain strength class.

The filling with structural concrete of the joints between the prefabricated concrete floor and roof elements and between these elements and the precast concrete structure shall be included. All reinforcement for robustness according to UNI-EN-1991-7, consequence class 2b and as stated in the structural calculations shall be placed in the joints to ensure a stable structure before casting the topping layer.

Each precast slab shall have the reinforcement bar bonded (via clamps) to adjacent reinforcement bars in other precast slabs. The rebar used at one end must be the same bar used at the opposite end, to ensure equipotential bonding. The reinforcement bar in the floor finish shall be bonded to the flat lower surface slab at two points.

Rebar in the structural concrete layer shall be engineered by the core and shell contractor and shall include all rebar for strength purposes, for stability purposes and for prevention of

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progressive collapse according to UNI-EN-1991-7, consequence class 2b. The minimum amount of rebar shall be Ø8/100. Rebar must be placed in the appropriate height of the structural concrete layer.

Composition of the structural concrete layer:

- Maximum strength class C30/37.
- Cement CEM II 32.5R following UNI EN 197-1:2011.
- Maximum cement quantity: 340 kg/m^3.
- Maximum grain size: according to structural reports.
- Main reinforcement according to structural calculations.

During hardening cover with insulation 20 mm; depending of temperature add materials to control maximal W/C factor, viscosity.

Scope:

- All structural layers on flat lower surface and pre-cast concrete floor slabs.

6.6. Reinforcement

All rebar is to have a minimum steel grade of B450C according to UNI EN 10080

In general, the production, delivery, laying and positioning including all installation accessories such as spacers, Clamps, etc. are to be included in the offer.

Reinforcement laying:

1. The ends of the binding wires must always be bent towards the inside of the concrete.
2. The engineer reserves the right to refuse the use unsatisfactory quality of spacers.
3. The reinforcement is to be controlled by the foreman, before the engineers' inspection and approval. Any deviation from the construction documentation (drawings) is to be communicated promptly.
4. The pouring of a concrete structural section/element may only take place after the reinforcement has been inspected and approved by the engineer. Eventual built-in

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parts and recesses/openings are to be controlled and approved in advance by the building services planner.

5. As a protection against injuries, connecting rods (starter bars) up to and including Ø 12 mm are usually delivered with a hooked end. Connection bars without hooked ends are to be covered with boards or plastic caps. Covering boards or plastic caps are to be a part of the offer.

Rebar connections:

1. Rebend-connections, screwed-connections reinforcements, etc. in vertical construction joints at wall junctions are specified and planned as a basic connection measure in the construction drawings and are to be closely coordinated with the architect and engineer. These are to be included in the offer.
2. Rebend-connections, screwed-connections reinforcements, etc. in horizontal construction joints for slabs (e.g. north exposed concrete walls) according to the requirements of the architect and the engineer. These are specified in the drawings and to be closely coordinated with the architect and engineer. These are to be included in the offer.
3. Reinforcement connections may only be used at locations specified on the drawings.
4. Screwed reinforcement connections are to be modified in accordance and compliance with the product regulations by the contractor.
5. Reinforcement welds, including assembly welds, are only allowed with approval of the engineer.

Punching shear reinforcement:

1. The information on the punching shear reinforcement as a local punching safety measures are recorded in the structural calculation.
2. Punching reinforcement strips are partly arranged directly on the columns and or punching shear locations, partly in addition to steel mushrooms or at wall ends and wall corners.

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3. The punching reinforcement strips must be marked with a clear designation, which can be easily recognized from above on the offset of the reinforcement element. Colour markings are not permitted.
4. Shear reinforcement in the form of punching shear cages, are expressly excluded.
5. Individual prices must be clearly stated in the parts list.

6.7. Typical reinforcement incidence

In the following the typical reinforcement incidence for cast in place structural element are reported :

- Foundation plinths: 70 kg/mc ;
- Structural slab: 65 kg/mc ;
- GE yard slab: 70 kg/mc.

6.8. Built-in steel elements

The following steel elements are to be inserted into the concrete by the contractor:

- Steel mushrooms (incl. Punching shear reinforcement).
- Steel plates with welded reinforcement for the transmission of force towards the main carrying concrete elements.

The offer of the contractor shall also include all the necessary services that are needed for a professional and timely work execution, including:

- Plans, workshop drawings, including correction runs, etc.
- Manufacturer qualification for welding: EXC2 (H2), according to standard UNI EN 1090-1-2.
- The construction documentation shall be presented to the engineer and architect for inspection and approx. within 3 weeks.
- Material procurement including transportation.
- Manufacture of the steel components.
- Necessary intermediate storage of material, semi-finished and finished products.
- Surface protection and other protective measures.
- Transport from the factory to the construction site including unloading to intermediate storage.

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- All expenses for holding and moving the steel parts, including all auxiliary structures and aids such as scaffolding, alignment sleeves, offset plates, board inserts, grouting mortar, etc.
- All test certificates and quality tests.
- Unit prices must be clearly stated as part of a list.

All expenses from the following explanations are to be included in the offer:

- The steel quality is defined in the structural calculation.
- The requirements for the steel mushrooms are defined in the structural calculation. In order to avoid mix-ups of the steel mushrooms, a clear, recognizable mark must be attached to the top of the element after assembly.
- In general, the weld seams must at least correspond to evaluation group C according to § 11.3.XII of D.M. 2018. The scope of testing of the weld seams is still to be established.
- The required surface protection is to be defined in the structural calculation and or architectural drawings/design.
- Damage to the steel elements and to its corrosion protection during transport and assembly, are to be remedied by the building contractor with suitable measures and are to be included in the offer.
- Weld on hot-dip galvanized components on site is NOT allowed.

6.9. Openings in-situ on reinforced concrete

Recesses and openings on the architectural drawings (e.g. for doors, windows, lift shafts, climbing zones, etc.) are to be included in the offer in accordance with the architectural drawings.

In addition, rectangular and in some cases round openings in the in-situ concrete components are required for technical installations. The number of additional recesses and openings is yet to be established but a reasonable number of openings ranging from 0.2 m to 3 m must be included in the offer.

All connections which are to penetrate the building beneath foundation level (lower walls) shall be watertight (based on water pressure of 2 meters height). MTC frames and HDPE ribbed conduits shall be cast in the in-situ concrete and of the foundations up to and including the ground floors. Stainless steel shall comply with EN 14401 and all local and national regulations. Unit rates shall be included in the Bill of Quantities.

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Openings and to be cast in provisions are indicated on mechanical and electrical design drawings, described in the mechanical and electrical technical specifications, and included in the 3D-revit-model of the project.

Scope:

- Openings in in situ (and precast) reinforced concrete foundations, walls and floors.

6.10. Earthing provisions for concrete structure

Earthing provisions shall be cast in the in situ reinforced concrete structure of foundation and ground floor, and shall be part of the other (Sub-)Contractors to be provided earthing installation:

- Earthing system according to Italian standard as reported in electrical SoR.
- Earth strip/tape consisting of stainless steel (St/St), dimensions 40 x 5 mm^2 strip, installed as a closed ring along the building perimeter.
- All bolt/clamp connections shall be St/St grade V4A.
- Earth strip/tape consisting of galvanised steel (St/tZn), dimensions 30 x 3.5 mm^2 strip, buried in the foundation beam/slab as indicated on drawings (earth mesh circa 20 x 120 m2).
- All bolt/clamp connections buried in the foundation shall be St/tZn.
- Earth mesh connection to the reinforcement bars in the foundation at intervals not exceeding 2m
- Rising earth terminal connections from the foundation earth mesh to the designated earth terminal positions as indicated on the drawings via St/St (V4A).
- For the total number of earth terminals on the inside of the Datacentre; see drawing Lightning and protection drawings.
- All rising earthing terminals shall be provided with a sealing collar before pouring the in-situ concrete.

See also DBA documents and drawings concerning earthing and lightning protection for MIL07.

Scope:

- Earthing provisions building structure.
- Earthing provisions outside elements.

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7. Pre-cast concrete elements

7.1. General

General calculations for the main column structure, beams and shear walls have been prepared by the Engineer and are shown on the structural drawings including the dimensions for the precast column sections and beams and thickness of precast shear walls for stairs and elevators cores.

Shop drawings, detailed calculations of the elements and their connection system, and all the legal documents for local authorities of precast elements shall be made by the Precast Concrete Contractor in coordination with the General Contractor. **Production of the precast elements cannot proceed until the drawings and calculations are approved by local authorities and/or the Engineer.** Calculations for secondary precast concrete structures shall be made by the Contractor.

Secondary precast concrete structures are amongst other, but not limited to (if required):

- Stairs and landings.
- Roof slabs for stairwells.
- Plinth walls.
- Plinths and anti-dig barriers for fences.
- Plinths for external lighting.
- Precast concrete of technological areas.
- Retention walls.

All of the above mentioned is to be included in the contractors offer as well as the individual requirements of the following sub-chapters.

Fire resistance of all precast concrete elements is minimal REI 60 according to the Italian standards and the fire safety design.

7.2. Prefabricated floor slabs

Non-insulated prefabricated concrete flat lower surface floor slab.

Thickness: 400mm on first floor, 300mm on roof level.

Concrete strength class minimum C50/60.

Steel FeP 1860, diameter 15.2 mm as per precaster calculations.

Fire resistance of all floors / roofs minimal REI 60 according to the Italian standards.

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Steel channel profiles inserted into precast elements ribs, in order to install hanging systems. Please see Chapter 12 for steel channel specifications.

Dead and live loads are given on the corresponding load-plans. Linear dead loads due to non-stuctural partitions between data modules needs to be evaluated, as indicated in the corresponding load-plan. Point loads or distributed loads due to MEP installations on roof needs to be evaluated, as indicated on the corresponding load-plan. Other loads, starting points and a general calculation are given in the main structural calculation report. Prefabricated floor slabs must be calculated with as stiff support to ensure maximum shear utilization.

Felt pad (SBR rubber) 10 x 120 mm^2 shall be applied to support the slabs.

Precast concrete slabs painting in colour.

Seal joints between the hollow core plates with PUR, cut and seal off.

Felling edges visible work.

Reference brand: Delfi P – Martini Prefabbricati, Pandal – Basso Prefabbricati, Sistema STN - Ema Prefabbricati. Please see Design Risk Register for further information.

Scope:

All flat lower surface floor elements on 1st floor and roof of the building.

7.3. Openings in precast floor slabs (including structural concrete layer)

Openings shall be made in the precast slabs according to the provided plans and details.

Rectangular and square openings shall be provided in the factory, including openings with same dimensions in the on-site to be made structural concrete layer.

Circular openings, not bigger than diameter 150 mm, shall preferably be included in the factory but can be drilled on site, through the flat lower surface floor slab elements and the structural concrete layer. Drilling shall be done with approval of the Engineer.

Including all necessary provisions to catch the drilling water and to support the concrete cylinders.

Drilling in the precast floor elements shall be done (locations and diameters) according to the instructions of the supplier/manufacturer of the floor elements and with approval of the Employer and/or Engineer.

For sealing and fireproofing some prescriptions should be followed by the General Contractor.

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For mechanical circular openings (in factory or in situ) lower flat slab between the ribs of the precast elements should be removed. In that way the fire sealing can be done at the bottom of the top concrete layer. The fire sealing should be done with Hilti fire-resistant ring type CFS-C P and acrylic sealant type CFS-S ACR, or products with equivalent characteristics. Analytical fire verification of the precast element should be done due to the different fire exposure of the load-bearing ribs.

Fire sealing for electrical and mechanical shafts should be done with Hilti type fire-resistant panel CFS-CT B or products with equivalent characteristics. The fire-resistant panels will have holes to allow the electrical containments to pass through.

Including temporary covering of the openings with plywood for safe working conditions.

The fire sealing between adiacent floor precast panels should be done with Hilti fire-resistant acrylic sealant type CFS-S ACR, or products with equivalent characteristics.

All the fire sealings of the project will be further detailed during WS4 design.

Please refer to the mechanical package for installation details, sealing and fireproofing of the openings after installation.

Openings and other provisions for technical installations shall be defined and coordinated by the Contractor and shall be included in the price (Bill of Quantities). The unit rates below for various sizes of openings and provisions are only for settlement in the event of changes at the request of the Engineer and/or Employer. Closing of openings (airtight and fire resistant) shall not be included.

7.4. Main precast reinforced concrete structure

Main precast concrete structure is made up of columns, beams, half beams and precast shear walls for cores.

- Serviceability Criteria:
  1. Beam/Girder/Truss/Floor vertical deflection limit according to local codes;
  2. Horizontal deflections as per requirements below and according to local codes, whichever is most stringent:

     H/500 (where H is the total building height)

     H_i/300 (where H_i is the individual storey height)
- Concrete strength class minimum C50/60 unless noted otherwise.

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- Aggregate: sand and gravel (maximum grainsize 25 mm, for beams grainsize 16mm is preferable due to rebar concentrations).
- All rebar minimum quality B450A.
- Structural starter bars, anchors, reinforcements and provisions for expansion joints, installations and architectural purposes shall be included. All structural cast in anchors for connecting steel structures shall be included.
- Gaps, grooves and/or profiles shall be made fire resistance if applicable.
- Gaps, spooling, welds, etc. which are not mentioned on the drawing shall only be made in close consultation with the Engineer.
- Rebar shall be worked out by contractor based on design report MIL07-DBA-XX-XX-CA-S-00001, and shall include all rebar for strength purposes, for stability purposes and for prevention of progressive collapse according to D.M. 2018 and EN-1991-7, consequence class 2b. Rebar for detailing purposes to be added by the contractor according to Italian standards.
- All materials needed for supports and connections to other elements shall be included.
- All hoisting anchors and other hoisting or assembly materials to be engineered by contractor.

The anchor points shall be placed in faces that are not visible after installation as much as possible. Positions of hoisting anchors are to be approved by the Engineer.

Recessed holes for hoisting anchors must be cleaned thoroughly and filled with cement-based resin.

- Beams for filigree slabs shall be produced as half beams and should include all stirrups and top layer reinforcement for the beam to function as a whole.
- Stability wall elements shall form an integrated structure with the columns and beams around them. Sides of the stability walls and columns will have flexible rebar pull-out boxes for these connections to be poured on site.
- Drilling shall only take place after approval by the Engineer.
- All repairs of concrete elements and structures shall be approved by the Engineer.
- Concrete works shall be according all local-, national regulations and European Norms.

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All support structures needed to erect the structure shall be designed and engineered by the contractor.

- The top face of all beams shall be roughened so that connection to the cast in place compression layer is guaranteed.
- Joints between the main precast elements shall be injected or poured in place unless otherwise specified. Quality of the filling material is minimum K70 [reference brand: Mapefill].
- All elements of the prefab structure shall be 60 minutes fire resistant. See main calculation for minimum coverage needed with regards to fire resistance.
- Electrical provisions should always be cast into the precast wall elements.

Scope:

- The main structure of the building, as shown on the drawings.

7.5. Earthing provisions precast concrete structure

Earthing provisions shall be cast in the precast reinforced concrete structural elements and shall be part of the Contractors scope in close coordination with the electrical Statement of Requirements.

Earthing provisions shall be cast in the in precast reinforced concrete structure, and shall be part of the by other (Sub-)Contractors to be provided earthing installation:

Columns will be provided with round bars of at least 10 mm.

Earthing terminals for connection to the functional Bonding conductor in the floor slab and main earth bars. Material needs to be corrosion resistant.

Functional bonding conductor perimeter of the building:

1. Every 10-meter max. (position of the down conductors lighting protection system) will be made a connection between ring earth electrode and functional bonding floor slab.
2. All down conductors to be completely concealed on façade by aluminium fixing profiles of Sandwich panels as per Architectural details. Do not mechanically fix. Minimize façade penetrations.
3. Connection will go through the wall with use of waterproof wall bushings.
4. Wall bushings will be positioned in the soil.
5. Material needs to be corrosion resistant.

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Earthing system according to Italian standard.

See also DBA documents and drawings concerning earthing and lightning protection for MIL07.

Scope:

- Earthing provisions precast concrete structure of the building.

7.6. Carpenters work

Applicable standard and rules:

- UNI 11763-1: Attrezzature provvisionali - Casseforme - Parte 1: Casseforme verticali - Requisiti generali per la progettazione, la costruzione e l'uso
- UNI U50.00.206.0 Casseforme – Requisiti generali per la progettazione, la costruzione, l'uso.

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8. Additional information for sustainable concrete

Some information about sustainable concrete are provide. **This item will be not implemented in the BOQ nor in the material specifications. However, an overview of potential implementation of green concrete is provided in this specification.**

There are two reference laws regarding information about low carbon concrete in Italy :

- *UNI 11104 – luglio 2025 – Calcestruzzo – Specificazione, prestazione, produzione e conformità – Specificazioni complementari per l'applicazione della EN206;*
- *UNI/PdR 176 – luglio 2025 – Profili di sostenibilità del calcestruzzo preconfezionato;*

UNI 11104 and UNI/PdR 176 identify two parameters in order to qualify the sustainability of concrete:

- **Global Warming Potential (GWP)** of concrete expressed as a series of ranges with an upper limit expressed in kilograms of CO2 per m3 of concrete
- **Reduction in the Global Warming Potential** of concrete compared to a reference expressed as a percentage reduction in the GWP of concrete compared to the GWP of a reference concrete.

The GWP of concrete can be calculated based on its formulation and the production and transport systems used, regardless of the characteristics or performance required, but its assessment and classification for sustainability purposes must be associated with a defined set of characteristics and performance (e.g. mechanical strength class C35/45). Both parameters, GWP and its reduction, should be specified in the project, in order to identify the parameters and specifications for the low carbon emission concrete.

According to law, there are two methods to prescribe a low carbon concrete:

- **Efficiency method:** this method provides indication of GWP class and efficiency class. UNI/PdR 176 provide classes of GWP, related to the amount of CO2 expressed in cubic meter. Each class has a ratio GWP/Rck. UNI/PdR 176 defines efficiency classes according to the ratio GWP/Rck shown before. The lower the ratio GWP/Rck and the efficiency class is, the better is the efficiency of GWP and the more sustainable the concrete is.
- **Reference method:** provides the design of a sustainable concrete, is the reference method. With that approach, the GWP of the design concrete is calculated in terms of reduction of the GWP of a reference concrete (GWP,REF). UNI/PdR 176 defines the GWP,REF for each resistance class of concrete. The GWP reduction class of concrete can be indicated by mechanical strength class (Cxx/yy). For example: concrete with strength class C25/30 having a 55% reduction in GWP compared to the reference (330 kg CO2/m3) is indicated with class GWR 50.

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For this project, it is possible to implement the following action to use green concrete.

Cast-in-place foundations

It is possible to use low carbon concrete in foundations but with limitations and constraints. In general, it not possible to go further concrete C28/35 with GWP-150-IT class - GWP,R 50 (reduction of CO2 between 50% and 60%) – Efficiency class Efc 5. This is the best performance we can reach with the actual technology. Higher resistance classes are feasible but with higher GWP classes. Longer time to reach the design resistance is required.

It is possible that G.C. will have difficulty responding adequately to these requests, according to the availability of the supply, and that there will be consequences on the costs and times of the construction site.

Slabs

For the cast-in-place top concrete layer of the slab it is possible to use a low carbon concrete, with the same costraints of the cast in place foundations. The quantity of concrete used is limited so for this work the overall impact is low.

Precast concrete structures

Precast elements like columns and beams will not have a specific GWP-150-IT class nor GWP,R class and efficiency class. However, the sustainability parameters should be provided by the EPD from the construction to the end of life of the product and its components like rebars, cables and concrete, which includes the environmental impact.

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9. Masonry works

9.1. General

The Contractor shall prepare sample walls of the blockwork walls, for approval by the Employer and/or Engineer (in case wall types are applicable):

- Cellular concrete blocks, 4 m^2, including skim coat finishing.
- Cellular concrete panels, 4 m^2, including paint coating or skim coat finishing.

Skim coat finishing as described in architectural SoR:

The Contractor shall submit the following items to the Employer and/or Engineer, for approval:

- Product data sheets cellular concrete blocks, glue-mortar and skim coat material;
- Product data sheets cellular concrete panels, including joint filling materials and fixations and skim coat material
- All other materials which will be used and installed such as anchors, strips, foam-tape;
- Certificates (from the manufacturer/supplier) proving the fire resistance of the walls;

Only undamaged blocks shall be installed. Smaller fitting blocks shall be made with appropriate cutting or sawing machines.

Maximum deviation for walls 5 m length or shorter: 8 mm.

Maximum deviation for walls over 5 m length: 12 mm.

Maximum deviation in any 2.5 m height of wall: 8 mm.

9.2. Mortar for masonry

Mortar design mix, class M10;

Mortar joints 5¸ 15 mm thick or glue provided by the block manufacturer.

9.3. Cellular concrete block walls

Mixes of cement conglomerate with selected grain sizes, to be made with patented procedures of vibration and compression and have the following minimum mechanical physical characteristics:

Specific weight 6.00 kN / mc

Average compressive strength on samples 4.50 N / sq mm

Flexural strength 0.89 N / sq mm

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Modulus of elasticity on specimens 2600 N / sq mm

Drying shrinkage 0.033 mm / m

Characteristic value at rupture due to compression on the masonry 3,3 N / sq mm

Characteristic value at rupture for shear on masonry 0.22 N / sq mm

“Admissible” compressive strength on masonry 0.75 N / sq mm (according to EN 771-4)

The previous physical characteristics can be demonstrated through certifications containing results of the tests and conducted by official laboratories in the production plants, in the manner prescribed by the current legislation.

The products are considered at the time of supply; the Director of Works for the purpose of their acceptance can carry out checks (even partial) on samples of the supply or request a certificate of compliance with prescriptions. In the event of a dispute, it is understood that the sampling procedures, the test methods and the evaluation of the results are those indicated in the UNI standards in force.

Walls shall be R/EI 60 certified following UNI EN 1363-1-2-3, as indicated on the drawings.

All blockwork walls, steel supporting columns, lintels, fixations, anchors, U- and L-shape flashings, reinforcement, expansion joints, pre-compressed foam tapes, insulation material, shall be indicated on workshop drawings by the Contractor.

Cellular concrete block non-stuctural walls will be designed according to seismic hazard: Strategic buildings class IV - ag/g = 0,074, ground cathegory C-T1, according to Italian Regulation “D.M. 17/01/2018 - Aggiornamento delle Norme tecniche per le costruzioni”

Scope:

- Data Module division walls, technical shafts walls, other non-structural partitions as indicated on drawings.

9.4. Pre-cast concrete lintels

Pre-cast concrete lintels shall be used in block walls above the (door and other) openings, clear width more than or equal to 500 mm, to support the weight of the blocks above.

Concrete strength class minimal C50/60, steel FeP 1860.

Note:

- Length of lintels according to national and local regulations, to be defined by the Contractor.
- At connections with steel columns and steel supports fire resistant coating or boarding shall be provided where applicable.

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Reference brand: Xella, VEBO.

Scope:

- Above wall openings, wider than 600 mm, in all types of blockwork walls.

9.5. Supporting steel elements for blockwork walls

Supporting steel elements for blockwork walls shall be delivered and installed by the Contractor.

Supporting steel elements:

- Steel columns (HE-A or IPE), for strengthening of block work walls with large dimensions (height and length of the blockwork walls).
- U-shape bended steel sheets, for fixation of block work walls to steel columns and sandwich panel or other type of elevations.
- L-shape bended steel sheets, for fixation of block work walls to upper steel structures and concrete ceilings.

Steel quality shall be minimal S235.

Finishing of supporting steel elements shall be same as finishing of steel structures.

Fire resistant coating or boarding 60 minutes same as fire resistance of the wall.

Coated / painted in case no fire resistance is required, including:

1. Fixation with spread anchors, bolts and nuts, pop-rivets, etc. Welding on site shall not be allowed.
2. Non-combustible (pre-compressed) foam tapes or mineral wool insulation material.
3. Non-combustible joint sealants for airtightness.
4. Fire-resistant joint sealants for fire resistance.

All elements and fixation bolts, nuts, etc. corrosion protected.

Fixation of the supporting steel elements to the main steel structure shall be without impermissible damaging of the fire-resistant coating of the main steel structure.

<u>Note:</u>

Alternative for the U-shape and L-shape bended steel sheets are steel anchors, mineral wool filling material and fire-resistant joint sealants as indicated on the typical details drawings as prepared by DBA PRO.

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Steel columns (only if applicable due to dimensions, length, height, thickness, of blockwork walls):

- Vertical steel I-shape columns with sheet plates at the bottom side and a flexible steel angle (provided with long hole to prevent vertical loads) at the top side.
- Columns shall be fixed with bolts, nuts and spread anchors to the floors and roofs of the building.
- Distance between the flanges of the I-shape columns: thickness of the blockwork wall + approx. 5 mm.
- Mineral wool insulation material, thickness 10 / 20 mm, shall be installed between the bodies of the steel beams and the front ends of the blockwork walls.

See Note above.

U-shape bended steel sheets:

- Vertical to be installed U-shaped steel sheets over the total height of the blockwork walls.
- U-shaped steel sheets shall be fixed with bolts, nuts, spread anchors, pop-rivets, etc.
- Distance between the flanges of the U-shaped steel sheet: thickness of the blockwork wall + approx. 5 mm. Height of the bended edges: 50 mm.
- Steel sheet thickness: 3 mm.
- Foam tape shall be installed between U-shape flashings and building elements.
- Mineral wool insulation material, thickness 10 / 20 mm, shall be installed between the bodies of the L-shape steel sheets and the front ends of the blockwork walls.

See Note above.

L-shape bended steel sheets:

- Horizontal to be installed L-shape steel sheets over the total length of the blockwork walls, on both sides, for horizontal support of the blockwork walls at the top sides.
- L-shaped steel sheets shall be fixed with bolts, nuts, spread-anchors, pop-rivets, etc.

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- Steel sheet thickness: 3 mm.
- Dimensions of the L-shaped steel sheets: 50 x 50 x 3 mm^3.
- Foam tape shall be installed between L-shape flashings and building elements.
- Mineral wool insulation material, thickness 10 / 20 mm, shall be installed between the building elements and the front ends of the blockwork wall.

See Note above.

Alternative: spread anchors (shall be calculated), joint to be filled with mineral wool and to be finished on both sides with fire resistant joint sealant. Including certificates.

Scope:

- Supporting steel elements necessary for the construction and fixation of blockwork walls.

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10. Steel structures

10.1. General

Calculations for the main structure have already been made by the Engineer and the structural positioning drawings indicating the steel sections being calculated.

Shop drawings shall be made by the Contractor based on the structural report MIL07-DBA-XX-XX-CA-S-00001 - Structural calculations.

Detailed calculations for the secondary steel structures shall be made by the Contractor, including workshop drawings and connection details. Vendor specific information plus requirements for shell items, services and equipment should be taken into the design by the contractor and should be included in the design.

Main structural elements are as follows, but not limited to (and in case applicable):

Main steel:

- Roof chiller platform ;
- Screen façade around roof platform ;
- Emergency walkway, stairs and landings ;

Secondary steel:

- Steel canopies mounted to main walls and parapets ;
- Screen wall around GE yard ;
- Facades and facade supporting structures for the building ;
- Façade supports for doors and windows ;
- Canopy in glass façade ;
- Parapet walls ;
- Equipment support frames on the roof ;
- Secondary steel for grid floors and equipment on the roof platform ;
- Secondary steel for grid floors and equipment in the riser shafts ;
- Secondary steel for sprinkler system ;
- Secondary steel for mechanical and electrical installations in the GE yard

For steel stairs and railings see Chapter 11.

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10.2. Material specifications

Main steel structure:

- Hot deep galvanized Steel quality S275 for open section profiles, Steel quality S235 for tubolar profiles and plates, unless noted otherwise.
- Execution class EXC3 according to UNI EN 1090-2.

Bolts and nuts steel structure:

- Quality minimal 8.8 unless noted otherwise.

Anchor bolts:

- Steel quality anchor bolts minimal 8.8 unless noted otherwise.

Secondary steel structure:

- Hot deep galvanized Steel quality S275 for open section profiles, Steel quality S235 for tubolar profiles and plates, unless noted otherwise.
- Execution class EXC3 according to UNI EN 1090-2

Bolts and nuts steel structure:

- Quality minimal 8.8 unless noted otherwise.

Anchor bolts:

- Steel quality anchor bolts minimal 4.6 unless noted otherwise.
-

A 1 ton Jib crane is set on the chiller platform steel deck, on the roof of the building, for handling heavy loads.

For the jib crane specification see the architectural SoR.

Detailed calculation of the deck steel frame and its connections shall be made by the Contractor, based on the jib crane technical data sheet specification.

10.3. Anchorages for main steel structures

Position, number and quality of the anchors (including nuts, etc.) are indicated on drawings and on the structural calculation. Drawings shall be approved by the Employer and/or Engineer.

- Anchors (including nuts, etc.) shall be delivered by the contractor.
- Anchors shall be installed and/or cast in by the contractor.

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- The contractor shall perform inspections of the correct installation of the anchors before pouring of the concrete and the installation of the steel structure.

Additional anchor requirements can be found on the architectural, electrical, and mechanical Statement of requirements.

Scope:

- Anchorages in the in-situ concrete structure for the installation of the steel platform, mechanical and electrical installations, external steel staircases.

10.4. Treatment for main steel structures

Primary steel structures hot dipped galvanized

Material: Hot dipped galvanized steel structure.

For external steel structures, excellent corrosion protection performance according to EN ISO 14713, Class C4.

For internal steel structures, excellent corrosion protection performance according to EN ISO 14713, Class C2.

The steel frame support structures including all bolts, foot plates, flanges etc. for the equipment on the roofs.

The complete steel frames hot dipped galvanized with a minimum layer thickness of 70 µm. No welding on site shall be allowed.

The steel frames consist of steel beams of U- and I-shaped steel profiles, as indicated on the drawings.

The steel support frames for the table coolers, etc. on the roof fixed to the concrete roof structure with steel H-shaped columns, foot plates and anchor bolts. Including welded flanges for a watertight connection with the roofing material.

Note: damages made by Contractor or other parties after installation, shall be repaired with a zinc compound paint by the Contractor prior to hand-over of the project. Hour tariff for reparation works included in the Bill of Quantities based on 20 man-hours shall be included.

Note: Steel supports for chimneys (of generator sets) on the roof are excluded.

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Scope: Hot dipped galvanized steel structures are amongst other, but not limited to:

- Platforms for technical installations on the roof.

Secondary steel structures hot dipped galvanized

Material: Hot dipped galvanized steel structure.

For external steel structures, excellent corrosion protection performance according to EN ISO 14713, Class C4.

For internal steel structures, excellent corrosion protection performance according to EN ISO 14713, Class C2.

The complete steel frames hot dipped galvanized with a minimum layer thickness of 70 µm. No welding on site shall be allowed.

The steel frames consist of steel beams of U- and I-shaped steel profiles according to drawings.

In particular, the design of secondary steel structure to support pipes and valves in the sprinkler room, must be provided by the sprinkler system supplier.

10.5. Pressed galvanized grating

The floor of the chiller platform and other floor gratings in general, are made by pressed galvanized grating with supporting strip 40x3 mm and mesh 22x76 mm, fixed at the main steel metal frame as per prescription of the producer.

The chillers are supplied with a customized steel metal frame, for their transport and fixing on site, and for the correct load distribution on the main steel substructure. The chiller's substructure is provided by the producer.

Secondary steel profiles are set among main profile to support chiller metal frames, check their correct position according to the chiller supply.

Scope: Hot dipped galvanized steel structures are amongst other, but not limited to:

- Secondary steel for raised grid floors on the roof platform;
- Supports for the mechanical (related) equipment on the roof and sprinkler room;
- Ramps and stairs for the roof platform;
- Support steel for equipment and gratings in riser shafts.

10.6. Secondary steel structures paint coated

Excellent corrosion protection performance according to EN ISO 12944, Class C1.

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Steel with an alkyd coating in in layer:

- Primer layer 60 µm.
- Finishing layer minimal 80 µm.

Preparation of the primer layer and application of the finishing coating according to the prescriptions of the manufacturer/supplier of the coating.

Reference brand coating: Sigma coatings; Sigmafast 20 primer.

Note: Damages made by (sub)contractor or other parties after installation, shall be repaired with an alkyd painting by the Contractor prior to hand-over of the project. Hour tariff for reparation works included in the Bill of Quantities based on 10 man-hours shall be included.

Scope: Coated steel structures:

- Secondary steel for elevations (sandwich panels, curtain walls), inside the building.
- Secondary steel for doors, windows and louvre openings.
- All other secondary steel structures which shall not be hot dipped galvanized.

10.7. Earthing provisions steel structure

Following elements shall be provided as part of the by other (Sub)-Contractors to be installed earthing installation:

- On the main steel structures welded strips (earthing rods) for bolt connections with copper strips of the earthing installation, to prevent damages of the coating or galvanic layer.
- Provisions to connect technical installations with the earthing system / steel structure.
- All main elements (columns and beams) of the main steel structure shall be connected electrically conductive. In case necessary cuppers strips / cables shall be installed to obtain electrically conductivity.

Earthing system according to Italian standard and electrical SoR.

See also DBA documents and drawings concerning earthing and lightning protection for MIL07.

Scope:

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- All primary steel structures of the building as described in paragraph *Primary steel structures paint coated* and paragraph *Primary steel structures hot dipped galvanized.*

10.8. Grouting under footings of steel columns

Joint grouting, joint filler with hard joint filling mass.

Fluid grouting, cement based, nearly shrink free:

Strength class: K70

Method: Joints shall be filled completely including de-aeration.

Scope:

Under all columns (footing plates) of the steel structure, raised steel floors and roof platforms.

10.9. Steel support frames for door frames in gypsum board walls

Door frames in gypsum board walls shall be supported by a steel support frame consisting of vertical and horizontal rectangular steel tubes, dimensions approximately 100 x 100 mm2, wall thickness 6 mm, or larger dimensions if required.

Excellent corrosion protection according to EN ISO 12944, Class C1.

Steel with an alkyd coating in one layer:

Primer layer 60 µm.

Finishing coatings shall be applied according to the prescriptions of the manufacturer/supplier.

Steel support frames to be fixed to the concrete and/or steel structure with expansion or chemical bolts/anchors.

Top side fixations with slotted holes to prevent vertical loads on the steel support frames.

Steel support frames shall be easily adjustable in height due to different locations and slope of roofs.

Steel support frames shall be covered with fire boarding or special fire-resistant gypsum board: minimal fire resistance same as fire resistance of the wall. See paragraph *Fire resistant boarding* in Architectural SoR.

Bottom horizontal element shall be dismountable with bolts and nuts.

Scope:

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- Wall openings for double swinging doors in gypsum board walls.
- Wall openings for single swinging doors in gypsum board walls in case walls are higher than 4 meters.

Note: Steel support frames not required for single swinging doors of office and meeting rooms, sanitary rooms, showers, cleaning rooms, in case the required strength/stiffness can be reached with the standard metal framework of the gypsum board wall.

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11. Ramp and stairs, and balusters

11.1. Ramp and steel stairs hot dipped galvanized, external

The steel stairs consisting of main steel beams, support beams for the landing platforms, steel columns, treads of steel grating and tubular sections for balusters and railings.

Emergency stairs: Steel quality: S355, Execution class EXC3 according to UNI EN 1090-2

Ramps and baluster: Steel quality: S235, Execution class EXC2 according to UNI EN 1090-2

Type of stairs: straight-run stairs, with landings as indicated on the drawings.

Stairs height: according to architectural drawings.

Riser (mm): according to architectural drawings.

Going (mm): according to architectural drawings.

Overlap (mm): minimum 40 mm.

Steps and platforms consisting of hot dipped galvanized gratings, minimal thickness 30 / 40 mm. The grating elements fixed with steel angles to the stair beams and landing platform structure.

Railings and/or handrails shall be provided on both sides of the stairs and on 2 or 3 sides of platforms as indicated on the drawings.

For railings, balusters and handrails see the architectural Statement of Requirement. Dimensions according to drawings, national and local regulations.

Note: Steel stairs on roof shall be fixed to steel platforms. Free space between bottom stairs and roof covering approximately 50 mm. No connections with roof structure / membrane is allowed.

Hot dipped galvanised steel elements shall be cleaned from sharp edges and zinc whiskers/flakes before installation.

Excellent corrosion protection performance according to EN ISO 14713, Class C4.

Scope: External steel emergency stairs, ramps and baluster.

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12. Fastening systems

12.1. Steel bar suspension system

Shop drawings, detailed calculations and certification of connections and suspension systems shall be made by the Contractor, based on Engineers' specific reports.

ETA certification and anti-seismic category C2 is required for all the fixing system of MEP installation, floors and false ceilings.

All fixing system must be designed considering the following loads:

- Seismic hazard:
  - Strategic buildings class IV - ag/g = 0,069, ground cathegory C-T1, according to Italian Regulation "D.M. 17/01/2018. Aggiornamento delle Norme tecniche per le costruzioni"

- Suspended loads (collateral loads):
  - As per calculation report MIL07-DBA-XX-XX-CA-S-00001 - Report - Structural calculations and load plans drawings.
  - Considering typical data module and electrical rooms collateral load of 2.5kN/sqm, characteristic static point load on U-channel will be 3.75kN (1.25m x 1.2m pitch). 1.25m is the U-channels spacing on the floor slab while 1.2m is secondary profiles pitch in the other direction.
  - Safety factor for all loads = 1,5 or supplier specification, if more stringent.

12.2. Fixation elements

- Fixation to the bottom side of the precast concrete flat slab using U-channels steel profiles inserted into precast elements ribs. Secondary profiles in the perpendicular direction should be provided, to make installations indipendent from the steel channels pattern.
- Post-installated anchoring should be avoided in any case, to speed up mechanical and electrical installations.
- U-channel should be the following ones:
  1. For static loads, U-channel type Hilti HAC-V-T30 and suspension screw type Hilti MQM F M12 Cl.8.8 or products with equivalent characteristics.

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2. For seismic loads, U-channel type Hilti HAC V50 and suspension screw type Hilti HBC-C-N M12 Cl.8.8 or products with equivalent characteristics.

- Fixation to cast in situ concrete floor slab with screw anchors, mechanical anchor bolts or chemical anchors. ETA certification and anti-seismic category C2 is required.
- Fixation to concrete walls with screw anchors, mechanical anchor bolts or chemical anchors. ETA certification and anti-seismic category C2 is required.

12.3. General prescriptions

- Detailed plan of the suspension system and anchor positions to be provided by contractor according to precast designer prescriptions, before precast element production.
- General layout of secondary steel for mechanical and electrical containment in the external yard should be provided by the installer.
- Anchors for hanging systems need to be installed on the U channel profiles casted into the ribs of the slab.
- All fixing systems have to ensure category C2 anti seismic certification.
- Through-bolts for heavy duty fixations shall be predisposed in the precast concrete slab by the precast designer
- Drilling/anchors at locations of reinforcement bars in slabs beams and/or columns is not allowed. Before drilling the structural element, the location of the reinforcement bars needs to be scanned.
- U-shape steel profiles: hot deep zinc coated elements, carefully cleaned from zinc whiskers.

Including supporting steel structures as indicated on drawings: hot deep zinc coated elements (carefully cleaned from zinc whiskers).

Scope:

- Fastening installations and secondary elements all over the building.

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13. Pipes under the floor slab / foundation

Utility lines (e.g. sewer system) come to lie under the floor slab / foundation. The laying of these lines is regulated in a separate tender package and is not part of this statement of requirements. The necessary earthworks calculations (i.e. trench construction) are to be carried out by the contractor and are to be added to the offer accordingly.

14. Dimensional tolerances

In general, the dimensional tolerance specifications of the following Italian standards, are to be applied to the building:

DPR n. 380/2001 Testo unico edilizia

UNI 10462 – Elementi edilizi – Tolleranze dimensionali – Definizione e classificazione

UNI 10463 – Elementi edilizi – Tolleranze dimensionali – Compatibilità della tolleranza naturale di processo dedotta statisticamente rispetto alla tolleranza di progetto

UNI 10464 – Elementi edilizi – Tolleranze dimensionali – Aliquote di casi favorevoli rientranti nell'intervallo di valori definiti dalla tolleranza naturale di processo per prodotti di serie

For structural elements and details:

Steel works: UNI EN 1090 - 2:2018 Annex B and D

Prestressed concrete works and masonry: UNI EN 13670:2010 Annex G

Checks on materials following D.M. 17-01-2018

If several requirements apply, the smaller tolerances/deviations are applicable.

ENGINEER TEAMS:

DBA PRO. S.P.A.

Viale Felissent 20/D 31020 Villorba (TV)

Italy

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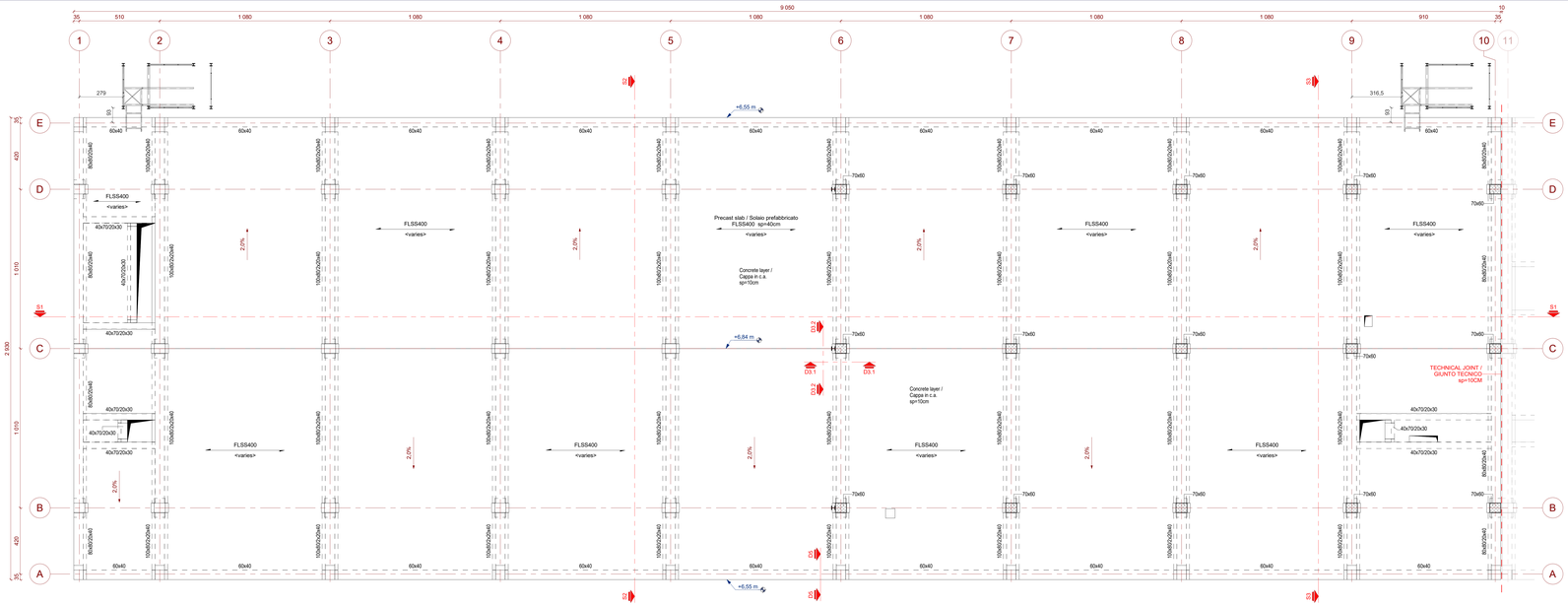
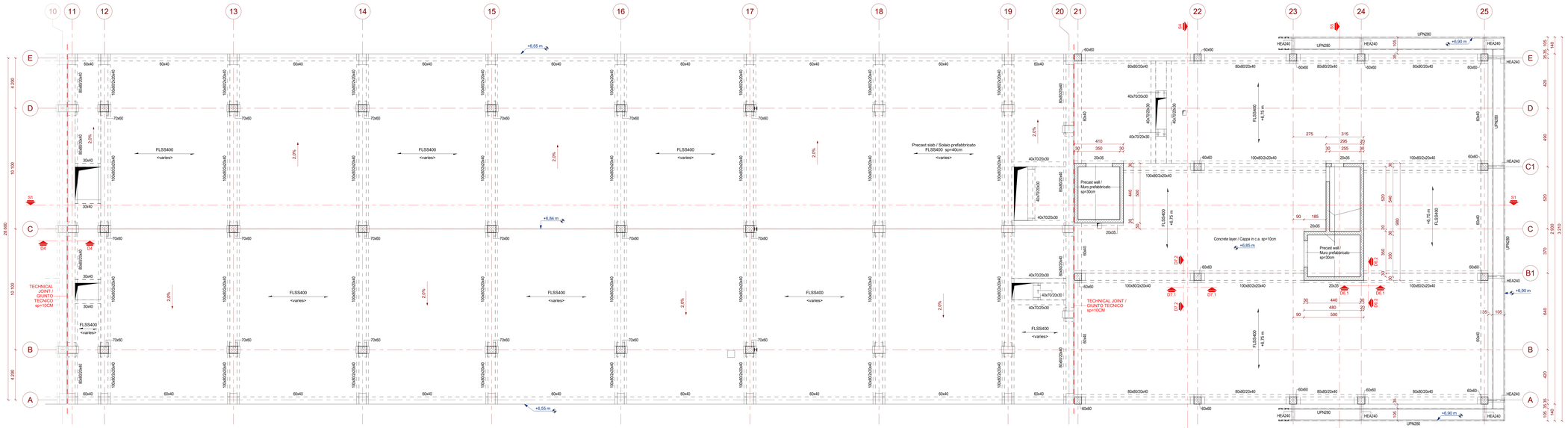


A2 First floor / Primo piano A2

1 : 100



A1/F First floor / Primo piano A1/F

1 : 100

PRESCRIZIONI SUI MATERIALI:

Tutti i prodotti da costruzione dovranno essere dotati di marchio C.E. ed essere conformi alle prescrizioni applicabili contenute nel Regolamento Europeo n° 305/2011 Condizioni armonizzate per la commercializzazione dei prodotti da costruzione.
Tutti i prodotti da costruzione dovranno essere di fuoco REI60.
Calcestruzzo a prestazione garantita in conformità alla UNI 11104:2016

CALCESTRUZZO per MAGRONE
Classe C12/15 Rck15 MPa fck=12 MPa

CALCESTRUZZO per FONDAZIONE EDIFICIO e INCLUSIONI RIGIDE
Calcestruzzo a prestazione garantita
Classe C25/30 Rck=30 N/mm² fck=25 N/mm²
Classe di esposizione: XC2
Classe di consistenza: S4
Rapporto A/C: 0.60
Quantità minima di cemento: 300 daN/mc*
Diametro nominale massimo inerte: 30 mm
Contenuto cloruri: ≤ 0.20

CALCESTRUZZO per FONDAZIONI AREA GE
Calcestruzzo a prestazione garantita
Classe C32/40 Rck=40 N/mm² fck=32 N/mm²
Classe di esposizione: XC2
Classe di consistenza: S4
Rapporto A/C: 0.50
Quantità minima di cemento: 300 daN/m³
Diametro nominale massimo inerte: 30 mm
Contenuto cloruri: ≤ 0.20

CALCESTRUZZO per PREFABBRICATI
Calcestruzzo a prestazione garantita
Classe C32/40 Rck=40 N/mm² fck=32 N/mm
Classe di esposizione: XC3
Classe di consistenza: –
Rapporto A/C: –
Dosaggio minimo di cemento: – daN/m³
Diametro nominale massimo inerte: 20 mm
Contenuto cloruri: ≤ 0.20

ACCIAIO per opere in C.A. ad aderenza migliorata: B450C
$f_{yk,nom}$ 450 MPa (valore nominale della tensione caratteristica a snervamento)
$f_{tk,nom}$ 540 MPa (valore nominale della tensione caratteristica a rottura)

IN CASO DI SPOSTAMENTI O NUOVI INSERIMENTI, DI SCARICHI ED OGNI ALTRA OPERA DI ATTRAVERSAMENTO DELLE FONDAZIONI O MURATURE, CONTATTARE PREVENTIVAMENTE LA DIREZIONE LAVORI DELL'ARPAT SERVIZIO CONTROLLARE TUTTE LE MISURE IN CANTIERE.

PRESCRIZIONI D'ESECUZIONE DELLE OPERE:

CORPERIMENTO MINIMO
Struttura di fondazione: 4 cm
Struttura di elevazione: 4 cm

LUNGHEZZA DI SOVRAPPOSIZIONE

Ø12	≥ 55 cm
Ø14	≥ 130 cm
Ø16	≥ 140 cm
Ø18	≥ 125 cm
Ø20	≥ 140 cm
Ø24	≥ 170 cm
Ø26	≥ 180 cm

SOVRAPPOSIZIONE RETI:
≥ 2 maglie min

CARATTERISTICHE DEI CLS A PRESTAZIONE:

Prescritto l'impiego di cemento tipo CEM II 32.5 conforme UNI EN 197-1:2011
Curva granulometrica di Fuller e misurazione degli inerti conforme alla norma UNI EN 933-1:2012

Classe di cloruri CL0.20 (contenuto massimo di cloruri =0.2%)
Come definito da prospetto 15 UN EN 206:2016

- LE MISURE SONO ESPRESSE IN cm SALVO DOVE DIVERSAMENTE INDICATO
- LE DIMENSIONI DEI FERRI SONO RIFERITE AL LORO INGOMBRO ESTERNO
- GLI ANGOLI DI SAGOMATURA SONO DI 90° SALVO DIVERSA INDICAZIONE

PARTICOLARE PEGATURE

TOLLERANZE GEOMETRICHE E CONTROLLI SUI MATERIALI
Strutture metaliche: UNI EN 1090 - 2:2018 Allegato B
Strutture in C.A.: UNI EN 13670:2010 Allegato G
Controlli sui materiali secondo il D.M. 17-01-2018

0.00 m = Quota finito architettonico

0.00 m

NOTA BENE

- Eseguire premontaggi dei telai e delle lamiere in officina.
- Tutte le misure sono da verificare in cantiere.
- L'elaborazione del presente disegno non esonera l'appaltatore dalla sua responsabilità per eventuali errori o omissioni a/o, comunque, per i vizi della opera.
- L'Appaltatore è tenuto ad un accurato controllo del disegno e a segnalare eventuali errori/omissioni, incompletezze o discordanze tra il presente elaborato e una qualsiasi norma di Legge.
- L'inadempienza a tale obbligo comporterà la relativa e completa responsabilità dell'Appaltatore.

LEGENDA FORI

- Foro Ø1mm per M6
- Foro Ø6mm per M8
- Foro Ø13.5mm per M12
- Foro Ø15.5mm per M14
- Foro Ø18mm per M16
- Foro Ø20mm per M18
- Foro Ø22mm per M20
- Foro Ø24mm per M22
- Foro Ø26mm per M24
- Foro Ø30mm per M27
- Foro Ø33mm per M30
- Foro Ø36mm per M33

Forature conforme a norma EN 1090-2:2018
NOTA: per strutture a bullone in piene, tutte le forature indicate dovranno essere ridotte di 5.5mm

interpretazione viste e sezioni secondo proiezione europea

TOLLERANZE GEOMETRICHE

Strutture Metalliche:
UNI EN 1090-2:2018 Annesso D
Strutture in CAA - CAP a mcrotaline:
UNI EN 13670:2010 Annesso G

Controlli sui materiali secondo il D.M. 17-01-2018

PRESCRIZIONE SUI MATERIALI

ACCIAIO per CARPENTERIA METALLICA:
Acciaio per profili aperti: S275J0
Acciaio per profili tubolari e piastrame: S235J0
Tutti i prodotti da costruzione dovranno essere dotati di marchio C.E. ed essere conformi alle prescrizioni applicabili contenute nel Regolamento Europeo n° 305/2011. Condizioni armonizzate per la commercializzazione dei prodotti da costruzione.
Classe di esecuzione: EXC2 carpenteria metallica
UNI EN 1090-2 classe: EXC2

PRESCRIZIONE SUI MEZZI D'UNIONE:

BULLONI ZINCATI A CALDO:
Vite classe 8.8 (UNI EN ISO 898-1:2013)
Dado tipo 8 (UNI EN ISO 898-2:2013)

SALDATURE
a cordoni d'angolo:

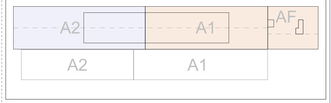
In dimensione del cordone, deve non essere superiore a quella indicata nel disegno

ESSENDO T1<T2
a1 = 0.7x T1

Metodologia Assemblaggio Carpenteria

Sistema antisvitamento con rondella Patnut

Sistema antisvitamento con controdado



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CLIENT / COMMITTENTE:

STACK INFRASTRUCTURE

STACK MIL07 Datacenter

Via Lombardia, 27010 Siziano PV

BIM Coordinator: Consulente BIM del Cliente
ARC:BIM
2nd Floor, 140 St John Street - London, GB

ARC:BIM

DESIGN TEAM / TEAM DI PROGETTO

CONSULTING DESIGNER / PROGETTISTA

ARCHITECTURAL DESIGN / PROGETTO ARCHITETTONICO
Arch. Daniele De Bettin
DBA S.p.A.
Viale Liguria 24, Milano (MI)

STRUCTURAL DESIGN / PROGETTO STRUTTURE
Ing. Diego Serafini
DBA S.p.A.
Viale G. G. Felissent 20D, Vittorio (TV)

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Ing. Gianluca Buiatti
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ELECTRICAL DESIGN / PROGETTO IMP. ELETTRICI E SPECIALI
Ing. Gianluca Buiatti
DBA S.p.A.
Via Natale Battaglia 10, Milano (MI)

COORDINATION / COORDINAMENTO
PM - *Alessandro Masaro*
BIM Manager - *S. Di Biase*
BIM Coordinator - *R. Sodano*

INTEGRATED DESIGN / PROGETTAZIONE COORDINATA

DBA

DBA S.p.A.
Sede legale:
Via Callalta, 1
31044 Montebelluna (TV)
Sede secondaria:
Via Cimabue, 11/13
35020 Padova (PD)
P. IVA / C.F. 04811730963
certificata ISO 9001:2015 - RINA n. IQ0220155 Valid.to 17-11-2018

PROJECT CODE	ORIGINATOR	FUNCTIONAL	SPACIAL B.	FORM	DISCIPLINE	TYPE	NUMBER
MIL07	DBA	AZ	01	DR	S	20	005

NOTES / NOTE:

DBA PROJECT CODE	PROJECT STAGE	STATUS / STATO	REVISION / REVISIONE	DATE / DATA
13038001	WS3	S4	P01	07/11/2025

REV.	IM	Rilis 3 Subcontrat	27/11/2025
REV.		REVISION DESCRIPTION / DESCRIZIONE REVISIONE	REVISION DATE

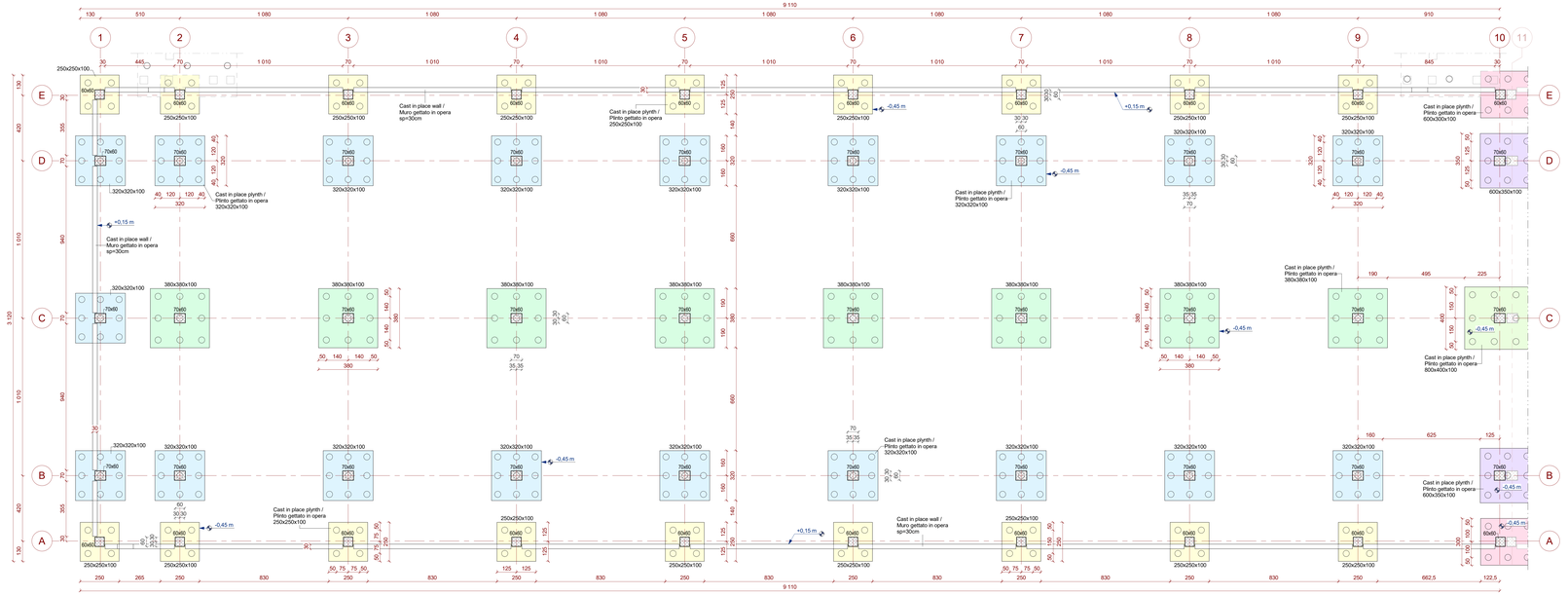
Client / Committente
STACK INFRASTRUCTURE

Oggetto:
Facility A
Primo piano
Planimetria strutturale
Subject:
Facility A
First floor
Structural plan

A0 +2 (841*1189)
SCALE / SCALA
1:100
DRAWN BY / DISEGNATO DA
A. Aceti
CHECKED BY / CONTROLLATO DA
E. Baratin
D. Serafini

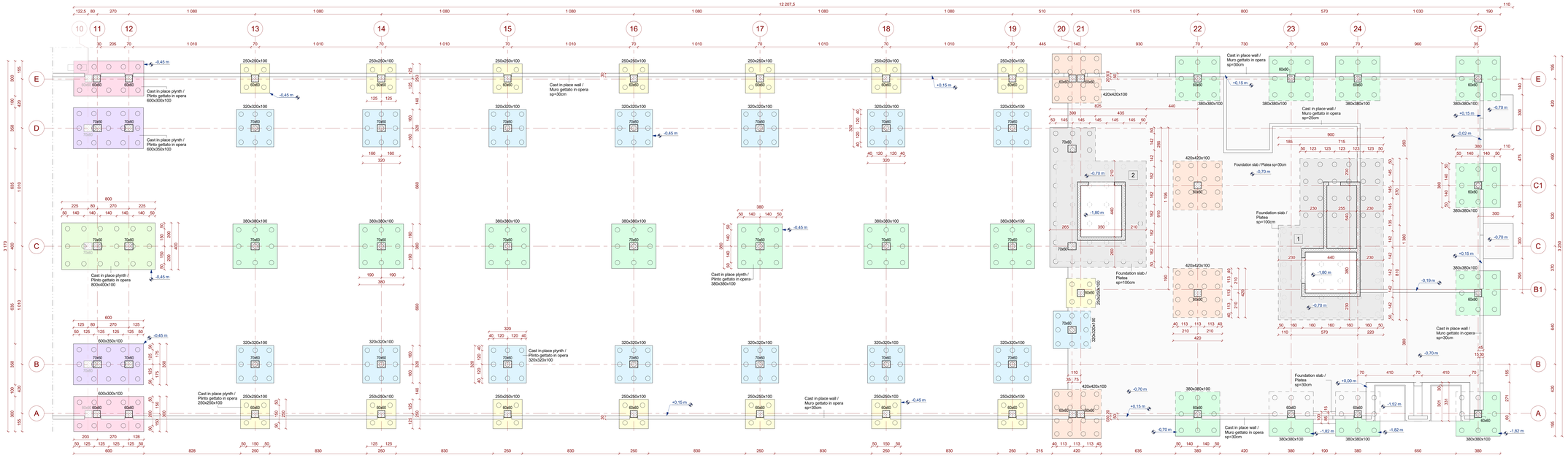
FILE NAME / NOME FILE: MIL07-DBA-AZ-01-DR-S-20005.PD1

PROPERTY OF DBA S.p.A. - NON UTILIZZABILE O REPLICABILE (ANCHE IN PARTE) SENZA CONSENSO SCRITTO DA PARTE DI DBA.



A2 Foundation / Fondazioni A2

1 : 100



A1/F Foundation / Fondazione A1/F

1 : 100

Foundation plynths schedule / Abaco plinti di fondazione

250x250x100cm/n°4 CFA Ø400mm L=10m	REGULAR REGOLARI
320x320x100cm/n°9 CFA Ø400mm L=10m	
380x380x100cm/n°9 CFA Ø400mm L=10m	
420x420x100cm/n° 16 CFA Ø400mm L=10m	
600x300x100cm/n° 10 CFA Ø400mm L=10m	
600x350x100cm/n° 15 CFA Ø400mm L=10m	
800x400x100cm/n° 18 CFA Ø400mm L=10m	
1 — 900x1380x100cm/n°60 CFA Ø400mm L=10m	SHAPED SAGOMATI
2 — 825x1195x100cm/n°42 CFA Ø400mm L=10m	

PRESCRIZIONI SUI MATERIALI:

Tutti i prodotti da costruzione dovranno essere dotati di marchio C.E. ed essere conformi alle prescrizioni del Regolamento UE 305/2011 (Regolamento Europeo n° 305/2011 Condizioni armonizzate per la commercializzazione dei prodotti da costruzione).
Tutti i materiali dovranno essere conformi alle norme di buona REGIE.
Calcestruzzo a prestazione garantita in conformità alla UNI 11104:2016

CALCESTRUZZO per MAGRONE
Classe C12/15 Rck=15 MPa fck=12 MPa

CALCESTRUZZO per FONDAZIONI EDIFICIO e INCLUSION RIGIDE
Calcestruzzo a prestazione garantita
Classe C25/30 Rck=30 N/mm² fck=25 N/mm²
Classe di esposizione: XC2
Classe di consistenza: S4
Rapporto A/C: 0.60
Quantità minima di cemento: 300 daN/mm³
Diametro nominale massimo inerte: 30 mm
Contenuto cloruri: 0.20

CALCESTRUZZO per FONDAZIONI AREA GE
Calcestruzzo a prestazione garantita
Classe C32/40 Rck=40 N/mm² fck=32 N/mm²
Classe di esposizione: XC4
Classe di consistenza: S4
Rapporto A/C: 0.50
Quantità minima di cemento: 300 daN/m³
Diametro nominale massimo inerte: 30 mm
Contenuto cloruri: 0.20

CALCESTRUZZO per PREFABBRICATI
Calcestruzzo a prestazione garantita
Classe C32/40 Rck=40 N/mm² fck=32 N/mm
Classe di esposizione: XC3
Classe di consistenza: –
Rapporto A/C: –
Dosaggio minimo di cemento: – daN/m³
Diametro nominale massimo inerte: 20 mm
Contenuto cloruri: cl 0.20

ACCIAIO per opere in C.A. ad aderenza migliorata: B450C
$f_{yk,nom}$ 450 MPa (valore nominale della tensione caratteristica a snervamento)
$f_{tk,nom}$ 540 MPa (valore nominale della tensione caratteristica a rottura)

IN CASO DI SPOSTAMENTI O NUOVI INSERIMENTI, DI SCARICHI ED OGNI ALTRA OPERA DI ATTRAVERSAMENTO DELLE FONDAZIONI O MURATURE, CONTATTARE PREVENTIVAMENTE LA DIREZIONE LAVORI DELLA OPERA STRUTTURALE.
L'APPALTATORE TUTTE LE MISURE IN CANTIERE.

PRESCRIZIONI D'ESECUZIONE DELLE OPERE:

COPRIFERRO MINIMO
Strutture di fondazione: 4 cm
Strutture di elevazione: 4 cm

LUNGHEZZA DI SOVRAPPOSIZIONE

Ø12	≥ 65 cm
Ø14	≥ 140 cm
Ø16	≥ 140 cm
Ø18	≥ 140 cm
Ø20	≥ 140 cm
Ø22	≥ 140 cm
Ø24	≥ 140 cm
Ø26	≥ 140 cm

s= 7020

SOVRAPPOSIZIONE RETE:
2 maglie min

CARATTERISTICHE DEI CLS A PRESTAZIONE:

Prescritto l'impiego di cemento tipo CEM II 32.5 conforme UNI EN 197-1:2011
Curva granulometrica di Fuller e misurazione degli inerti conforme alla norma UNI EN 933-1:2012

Classe di cloruri CL0.20 (contenuto massimo di cloruri =0.2%)
Come definito da prospetto 15 UN EN 206:2016

- LE MISURE SONO ESPRESSE IN cm SALVO DOVE DIVERSAMENTE INDICATO
- LE DIMENSIONI DEI FERRI SONO RIFERITE AL LORO INGOMBRO ESTERNO
- GLI ANGOLI DI SAGOMATURA SONO DI 90° SALVO DIVERSA INDICAZIONE

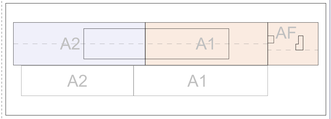
PARTICOLARE PEGATURE

D=72 (EBR LONGITUDINALI Fi<8)

D=82 (STAFFE E GANCI Fi≥8)

TOLLERANZE GEOMETRICHE E CONTROLLI SU MATERIALI
Strutture metalliche: UN EN 1090 - 2:2018 Annesso B
Strutture in C.A.: UNI EN 13670:2010 Annesso G
Controlli sui materiali secondo il D.M. 17-01-2018

0.00 m = Quota finito architettonico



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CLIENT / COMMITTENTE:

STACK INFRASTRUCTURE

STACK MIL07 Datacenter

Via Lombardia, 27010 Siziano PV

BIM Coordinator / Consulente BIM del Cliente
ARC:BIM
2nd Floor, 140 St John Street - London, GB

ARC:BIM

DESIGN TEAM / TEAM DI PROGETTO

CONSULTING DESIGNER / PROGETTISTA

ARCHITECTURAL DESIGN / PROGETTO ARCHITETTONICO
Arch. Daniele De Betto
DBA S.p.A.
Viale Liguria 24, Milano (MI)

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Ing. Diego Serafini
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Viale G. G. Felissent 20D, Vittorita (TV)

MECHANICAL DESIGN / PROGETTO IMP. MECCANICI ED ELETTRICI
Ing. Sandro Buselli
DBA S.p.A.
Via Natale Battaglia 10, Milano (MI)

ELECTRICAL DESIGN / PROGETTO IMP. ELETTRICI E SPECIALI
Ing. Sandro Buselli
DBA S.p.A.
Via Natale Battaglia 10, Milano (MI)

COORDINATION / COORDINAMENTO
PM - Alessandro Masaro
BIM Manager - S. Di Biase
BIM Coordinator - R. Solano

INTEGRATED DESIGN / PROGETTAZIONE COORDINATA

DBA

DBA S.p.A.
Sede legale:
Via Leonardo, 19
20122 S. Donato di Lecco (BL)
Sede operativa:
Viale Felissent, 20D
31020 Vittorio Veneto (TV)
certificata ISO 9001:2015 - RINA - n.9220/15/S Cdlecco n.11158/10

Sede secondaria:
Via Natale Battaglia, 10
20127 Milano (MI)
tel. 02 - 91322-1
fax 02 - 91322-201
dba@dba.it - www.dba.it

PROJECT CODE	ORIGINATOR	FUNCTIONAL	SPACIAL B.	FORM	DISCIPLINE	TYPE	NUMBER
MIL07	DBA	AZ	FN	DR	S	16	001

NOTES / NOTE:

DBA PROJECT CODE	PROJECT STAGE	STATUS / STATO	REVISION / REVISIONE	DATE / DATA
13038001	WS3	S4	P01	07/11/2025

REV.	ISS. / Rev. / Subindex	REVISION DESCRIPTION / DESCRIZIONE REVISIONE	REVISION DATE
REV.			

Client / Committente: STACK INFRASTRUCTURE

Oggetto:
Facility A
Livello fondazioni
Fondazioni

Subject:
Facility A
Foundation level
Foundations

SCALE / SCALA: 1:100

DRAWN BY / DISEGNATO DA: A. Aceti

CHECKED BY / CONTROLLATO DA: E. Barattin

APPROVED BY / APPROVATO DA: D. Serafini

FILE NAME / NOME FILE: MIL07-DBA-AZ-FN-DR-S-16001-P01.2

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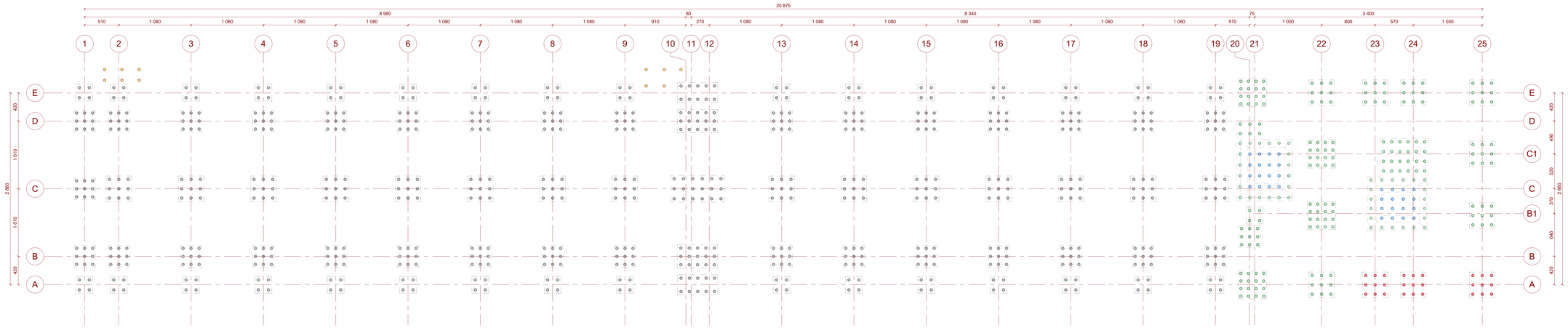
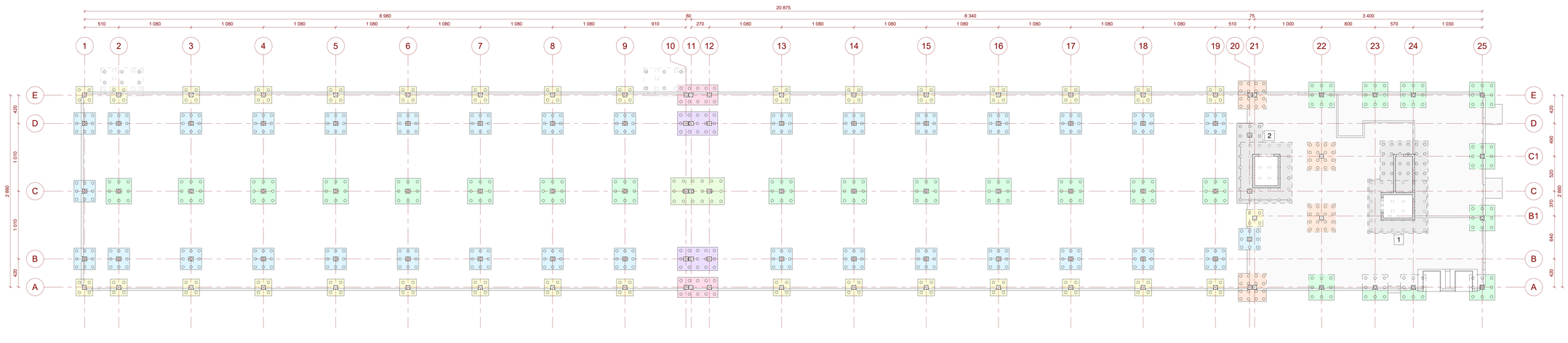


Piles plan / Pianta pali

1 : 200



Foundation / Fondazioni

1 : 200

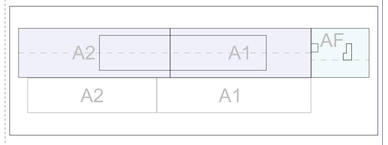
0 2 4 6 8 10m

Settlement reduction piles schedule / Abaco pali riduttori di cedimento

CFA Ø400mm L=10m (-0.62m --> -10.62m)	11x
CFA Ø400mm L=10m (-1.45m --> -11.45m)	628x
CFA Ø400mm L=10m (-1.70m --> -11.70m)	210x
CFA Ø400mm L=10m (-2.80m --> -12.80m)	32x
CFA Ø400mm L=10m (-2.82m --> -12.82m)	27x
TOTAL PILES / PALI TOTALI	**908x**

Foundation plynths schedule / Abaco plinti di fondazione

250x250x100cm /n°4 CFA Ø400mm L=10m	REGULAR REGOLARI
320x320x100cm/n°9 CFA Ø400mm L=10m	
380x380x100cm/n°9 CFA Ø400mm L=10m	
420x420x100cm/n°16 CFA Ø400mm L=10m	
600x300x100cm/n°10 CFA Ø400mm L=10m	
600x350x100cm/n°15 CFA Ø400mm L=10m	
800x400x100cm/n°18 CFA Ø400mm L=10m	
1 900x1380x100cm/n°60 CFA Ø400mm L=10m	SHAPED SAGOMATI
2 825x1195x100cm/n°42 CFA Ø400mm L=10m	



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CLIENT / COMMITTENTE:

STACK INFRASTRUCTURE

Project Name / Progetto:
STACK MIL07 Datacenter

Location / Indirizzo progetto:
Via Lombardia, 27010 Siziano PV

BIM Client Consultant / Consulente BIM del Cliente
ARC:BIM
2nd Floor, 140 St John Street - London, GB

DESIGN TEAM / TEAM DI PROGETTO

CONSULTING DESIGNER / PROGETTISTA
ARCHITECTURAL DESIGN /
PROGETTO ARCHITETTONICO
Arch. Daniele De Bellis
DBA S.p.A.
Viale Liguria 24, Milano (MI)

STRUCTURAL DESIGN /
PROGETTO STRUTTURE
Ing. Diego Serafini
DBA S.p.A.
Viale G. G. Felissent 20D, Villorba (TV)

MECHANICAL DESIGN /
PROGETTO IMP. MECCANICI ED ELETTRICI
Ing. Sacha Buseti
DBA S.p.A.
Via Natale Battaglia 10, Milano (MI)

ELECTRICAL DESIGN /
PROGETTO IMP. ELETTRICI E SPECIALI
Ing. Sacha Buseti
DBA S.p.A.
Via Natale Battaglia 10, Milano (MI)

COORDINATION / COORDINAMENTO
PM - *Alessandro Maiorero*
BIM Manager - *S. Di Biase*
BIM Coordinator - *R. Sodano*

INTEGRATED DESIGN / PROGETTAZIONE COORDINATA:

DBA

DBA S.p.A.
Sede legale:
Piazza Maria, 19
32043 S. Stefano di Cadore (BL)
P.IVA: IT01070250257
certificata ISO 9001:2015 RINA n.9620/15/S Cofano L.T.-100213

Sede secondaria:
Viale Felissent, 20/D
31020 Villorba (TV)
Tel. +39 0422 1710500
www.dba-spa.eu

PROJECT CODE	ORIGINATOR	FUNCTIONAL	SPACIAL EL.	FORM	DISCIPLINE	TYPE	NUMBER
MIL07	DBA	AZ	FN	DR	S	17	001

NOTES / NOTE:

DBA PROJECT CODE	PROJECT STAGE	STATUS / STATO	REVISION / REVISIONE	DATE / DATA
13038001	WS3	S4	P01	07/11/2025

REV.	DESCRIPTION / DESCRIZIONE	DATE
P01	1st - Wks 3 Submittal	07/11/2025

REV. - REVISION DESCRIPTION - DESCRIZIONE REVISIONE - REVISION DATE

Client / Committente: STACK INFRASTRUCTURE

Oggetto:
Facility A
Livello fondazioni
Panoramica fondazioni e pali

Subject:
Facility A
Foundation level
Foundation and piles overview

SIZE / FORMATO: A0 +1 (841*1189)
SCALE / SCALA: 1:200
DRAWN / DISEGNATO: A. Aceti
CHECKED / CONTROLLATO: E. Baratitin
APPROVED / APPROVATO: D. Serafini
DATE / DATA: 05/11/2025
DRAWING NUMBER / NUMERO DISEGNO: 13038001-AZ-FN-DR-S-17001-P01

FILE NAME / NOME FILE: MIL07-DBA-AZ-FN-DR-S-17001-P01.dwg

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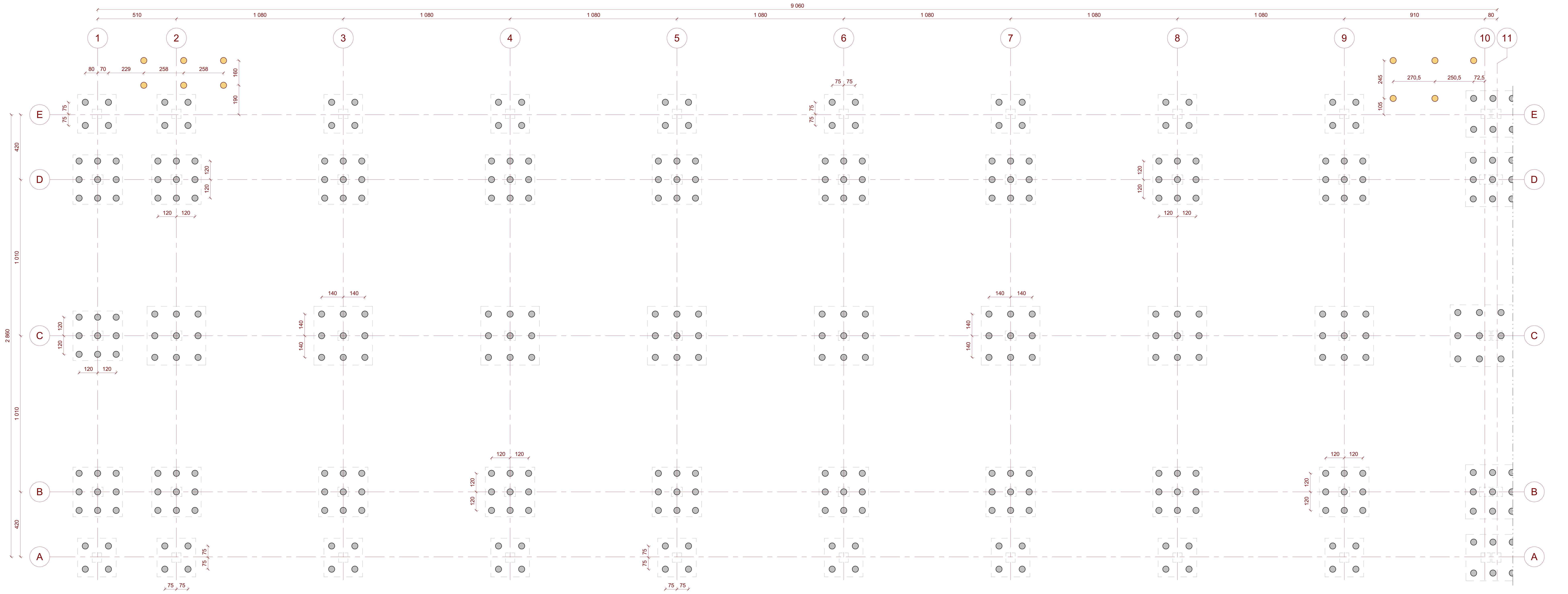
DBA S.p.A. Società a responsabilità unica soggetta a quanto stabilito dalla L.R. n. 7/2000 e sue modifiche ed integrazioni, D.Lgs. n. 231/2001 e sue modifiche ed integrazioni, D.Lgs. n. 196/2003 e sue modifiche ed integrazioni, Regolamento UE 2016/679 (GDPR) e D.Lgs. n. 101/2018 e sue modifiche ed integrazioni



A2 Piles plan / Pianta pali A2

1 : 100

A1/F Piles plan / Pianta pali A1/F

1 : 100

Settlement reduction piles schedule / Abaco pali riduttori di cedimento	
CFA Ø400mm L=10m (-0.62m --> -10.62m)	11x
CFA Ø400mm L=10m (-1.45m --> -11.45m)	628x
CFA Ø400mm L=10m (-1.70m --> -11.70m)	210x
CFA Ø400mm L=10m (-2.80m --> -12.80m)	32x
CFA Ø400mm L=10m (-2.82m --> -12.82m)	27x
TOTAL PILES / PALI TOTALI	908x

0 2 4 6 8 10m

PRESCRIZIONI SUI MATERIALI:

Tutti i prodotti da costruzione dovranno essere dotati di marchio C.E. ed essere conformi alle Norme Europee, con particolare riferimento al Regolamento Europeo n°305/2011:Condizioni armonizzate per la commercializzazione dei prodotti da costruzione.
Tutte le strutture hanno caratteristica di resistenza al fuoco REI60.
Calcestruzzo a prestazione garantita in conformità alla UNI 11104:2016

CALCESTRUZZO per MAGRONE
Classe C12/15 Rck>15 MPa fck>12 MPa

CALCESTRUZZO per FONDAZIONI EDIFICIO e INCLUSIONI RIGIDE
Calcestruzzo a prestazione garantita
Classe C25/30 Rck>30 N/mm² fck>25 N/mm²
Classe di esposizione: XC2
Classe di consistenza: S4
Rapporto A/C: 0,60
Dosaggio minimo di cemento: 300 daN/mm³
Diametro nominale massimo inerte: 30 mm
Contenuto cloruri: cl 0.20

CALCESTRUZZO per FONDAZIONI AREA GE
Calcestruzzo a prestazione garantita
Classe C32/40 Rck>40 N/mm² fck>32 N/mm²
Classe di esposizione: XC4
Classe di consistenza: S4
Rapporto A/C: 0,50
Dosaggio minimo di cemento: 300 daN/m³
Diametro nominale massimo inerte: 30 mm
Contenuto cloruri: cl 0.20

CALCESTRUZZO per PREFABBRICATI
Calcestruzzo a prestazione garantita
Classe C45/55 Rck>55 N/mm fck>45 N/mm
Classe di esposizione: XC3
Classe di consistenza: -
Rapporto A/C: -
Dosaggio minimo di cemento: - daN/m³
Diametro nominale massimo inerte: 20 mm
Contenuto cloruri: cl 0.20

ACCIAIO per opere in C.A. ad aderenza migliorata: B450C
f_{yknom} 450 MPa (valore nominale della tensione caratteristica a snervamento)
f_{tknom} 540 MPa (valore nominale della tensione caratteristica a rottura)

IN CASO DI SPOSTAMENTI O NUOVI INSERIMENTI, DI SCARICHI ED OGNI ALTRA OPERA DI ATTRAVERSAMENTO DELLE FONDAZIONI O MURATURE, CONTATTARE PREVENTIVAMENTE LA DIREZIONE LAVORI DELLE OPERE STRUTTURALI. CONTROLLARE TUTTE LE MISURE IN CANTIERE

PRESCRIZIONI D'ESECUZIONE DELLE OPERE:

COPRIFERRO MINIMO:
Strutture di fondazione: 4 cm
Strutture di elevazione: 4 cm

LUNGHEZZA DI SOVRAPPOSIZIONE

s s= 70Ø

Ø12 s ≥ 85 cm
Ø14 s ≥ 100 cm
Ø16 s ≥ 110 cm
Ø18 s ≥ 120 cm
Ø20 s ≥ 140 cm
Ø24 s ≥ 160 cm
Ø26 s ≥ 180 cm

SOVRAPPOSIZIONE RETE:
2 maglie min.

CARATTERISTICHE DEI CLS A PRESTAZIONE:

Prescritto l'impiego di cemento tipo CEM II 32.5 conforme UNI EN 197-1:2011
Curva granulometrica di Fuller e misurazione degli inerti conforme alla norma UNI EN 933-1:2012

Classe di cloruri CL0,20 (contenuto massimo di cloruri <0.2%)
Come definito da prospetto 15 UNI EN 206:2016

- LE MISURE SONO ESPRESSE IN cm SALVO DOVE DIVERSAMENTE INDICATO.
- LE DIMENSIONI DEI FERRI SONO RIFERITE AL LORO INGOMBRO ESTERNO.
- GLI ANGOLI DI SAGOMATURA SONO DI 90° SALVO DIVERSA INDICAZIONE

PARTICOLARE PIEGATURE

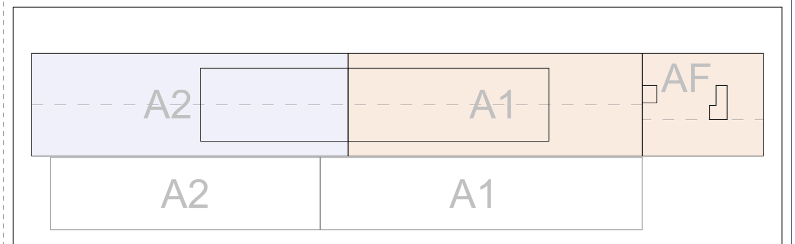
D=7Ø
FERRI LONGITUDINALI Ø>16

D=4Ø
STAFFE E GANCI Ø≤16

TOLLERANZE GEOMETRICHE E CONTROLLI SUI MATERIALI
Strutture metalliche: UNI EN 1090 - 2:2018 Annesso B
Strutture in CAN - CAP: UNI EN 13670:2010 Annesso G
Controlli sui materiali secondo il D.M. 17-01-2018

0.00 m = Quota finito architettonico

0.00 m



Il presente elaborato è valido solo in coordinamento con tutte le altre discipline specialistiche con le quali deve essere verificata la conformità. Tutte le misure ed eventuali variazioni rispetto al presente elaborato devono essere verificate in cantiere.
This plan only valid in connection & coordination with the plans of all other Specialist disciplines, and must be checked for conformity with these plans. Deviations in dimensions must be clarified with the site management.

CLIENT / COMMITTENTE:

Project Name / Progetto:
STACK MIL07 Datacenter

Location / Indirizzo progetto:
Via Lombardia, 27010 Siziano PV

BIM Client Consultant / Consulente BIM del Cliente
ARC:BIM
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DESIGN TEAM / TEAM DI PROGETTO

CONSULTING DESIGNER / PROGETTISTA

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Viale Liguria 24, Milano (MI)

STRUCTURAL DESIGN / PROGETTO STRUTTURE
Ing. Diego Serafini
DBA S.p.A.
Viale G. G. Felissent 20D, Villorba (TV)

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ELECTRICAL DESIGN / PROGETTO IMP. ELETTRICI E SPECIALI
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DBA S.p.A.
Via Natale Battaglia 10, Milano (MI)

COORDINATION / COORDINAMENTO
PM - *Alessandro Masiero*
BIM Manager - *S. Di Biase*
BIM Coordinator - *R. Sodano*

INTEGRATED DESIGN / PROGETTAZIONE COORDINATA:

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Sede secondaria: Viale Felissent, 20/D, 31020 Villorba (TV), tel. +39.0422.693511
certificata ISO 9001:2015 RINA n.5923/01/S IQNet n.IT-19510

PROJECT CODE	ORIGINATOR	FUNCTIONAL	SPACIAL B.	FORM	DISCIPLINE	TYPE	NUMBER
MIL07	DBA	AZ	FN	DR	S	17	002

NOTES / NOTE:

DBA PROJECT CODE	PROJECT STAGE	STATUS / STATO	REVISION / REVISIONE	DATE / DATA
13038001	WS3	S4	P01	07/11/2025

REV.	REVISION DESCRIPTION / DESCRIZIONE REVISIONE	REVISION DATE
P01	S4 – Riba 3 Submittal	07/11/2025

Client / Committente: STACK INFRASTRUCTURE

Oggetto:
Facility A
Livello fondazioni
Disposizione pali di fondazione

Subject:
Facility A
Foundation level
Foundation piles layout

SIZE / FORMATO: A0 +2 [841*1609]
SCALE / SCALA: 1:100
DRAWN / REDATTO: A. Aceti
CHECKED / CONTROLLATO: E. Barattin
APPROVED / APPROVATO: D. Serafini

FILE NAME / NOME FILE: MIL07-DBA-AZ-FN-DR-S-17002.P01

Revit Model: MIL07-DBA-ZZ-ZZ-M3-S-000001
Project Number: 13038001

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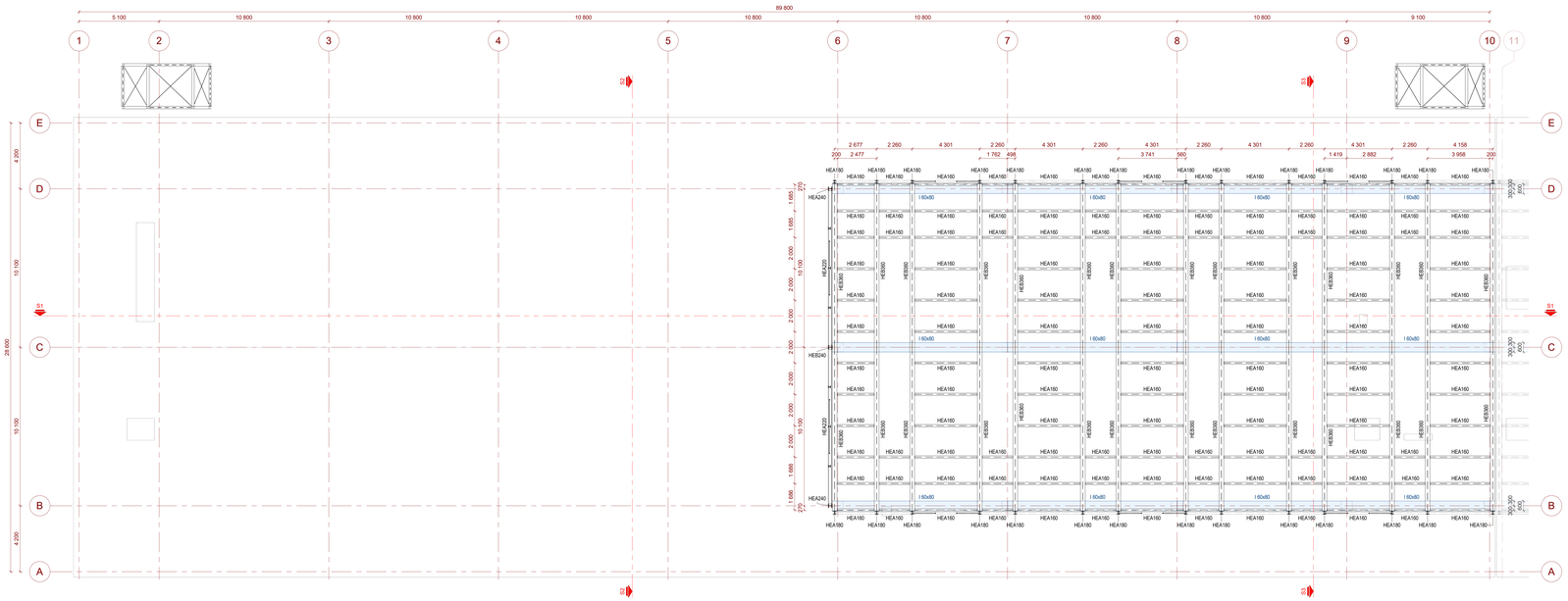
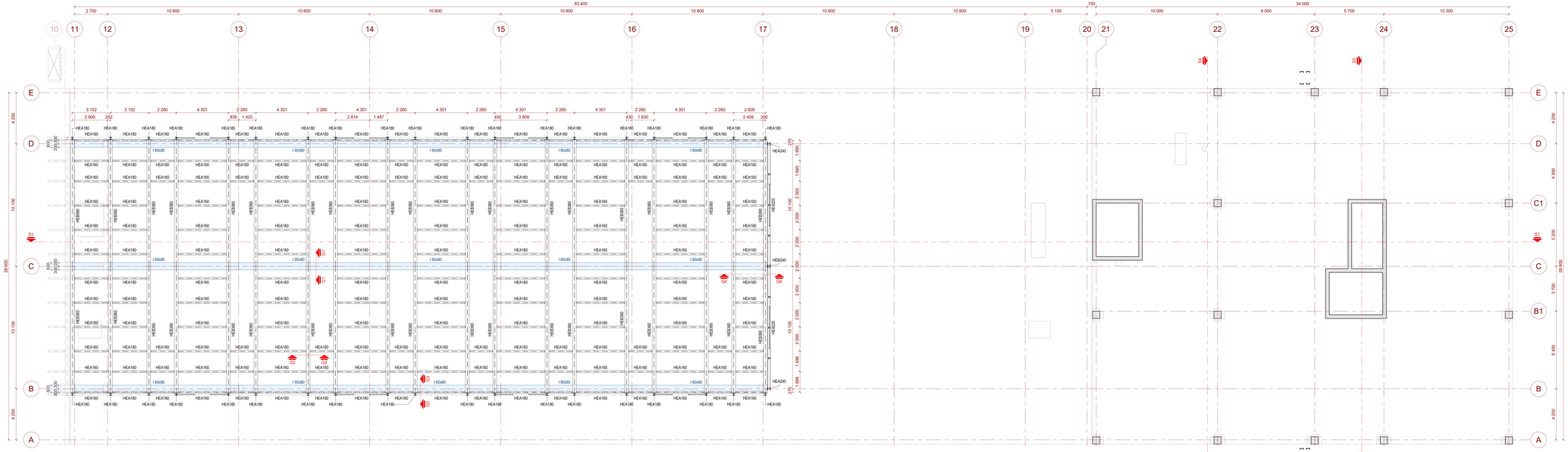


A2 Roof gantry / Piattaforma chillers A2

1 : 100



A1 Roof gantry / Piattaforma chillers A1

1 : 100

PRESCRIZIONI SUI MATERIALI:

Tutti i prodotti da costruzione dovranno essere dotati di marchio C.E. ed essere conformi alle Direttive Comunitarie applicabili e/o al Regolamento Europeo n° 305/2011.Consolidare armonizzate per la commercializzazione dei prodotti da costruzione.
Classe di esecuzione per carpenteria metallica secondo il fuoco REI60.
Calcestruzzo a prestazione garantita in conformità alla UNI 11104:2016

CALCESTRUZZO per MAGRONE:
Classe C12/15 Rck=15 MPa fck=12 MPa

CALCESTRUZZO per FONDAZIONI EDIFICIO e INCLUSIONI RIGIDE:
Calcestruzzo a prestazione garantita:
Classe C25/30 Rck=30 N/mm² fck=25 N/mm²
Classe di esposizione: XC2
Classe di consistenza: S4
Rapporto A/C: 0.60
Quantità minima di cemento: 300 daN/mm³
Diametro nominale massimo inerte: 30 mm
Contenuto cloruri: cl 0.20

CALCESTRUZZO per FONDAZIONI AREA GE:
Calcestruzzo a prestazione garantita:
Classe C32/40 Rck=40 N/mm² fck=32 N/mm²
Classe di esposizione: XC4
Classe di consistenza: S4
Rapporto A/C: 0.50
Quantità minima di cemento: 300 daN/m³
Diametro nominale massimo inerte: 30 mm
Contenuto cloruri: cl 0.20

CALCESTRUZZO per PREFABBRICATI:
Calcestruzzo a prestazione garantita:
Classe C32/40 Rck=40 N/mm² fck=32 N/mm²
Classe di esposizione: XC3
Classe di consistenza: –
Rapporto A/C: –
Dosaggio minimo di cemento: – daN/m³
Diametro nominale massimo inerte: 20 mm
Contenuto cloruri: cl 0.20

ACCIAIO per opere in C.A. ad aderenza migliorata: B450C:
$f_{yk,nom}$ 450 MPa (valore nominale della tensione caratteristica a snervamento)
$f_{tk,nom}$ 540 MPa (valore nominale della tensione caratteristica a rottura)

IN CASO DI SPOSTAMENTI O NUOVI INSERIMENTI, DI SCARICHI ED OGNI ALTRA OPERA DI ATTRAVERSAMENTO DELLE FONDAZIONI O MURATURE, CONTATTARE PREVENTIVAMENTE LA DIREZIONE LAVORI DELL'OPERA STRUTTURALE.
L'CORTEGLIUNE TUTTE LE MISURE IN CANTIERE.

PRESCRIZIONI D'ESECUZIONE DELLE OPERE:

CORRIMENTO MINIMO
Strutture di fondazione: 4 cm
Strutture di elevazione: 4 cm

LUNGHEZZA DI SOVRAPPOSIZIONE

Ø12	55 cm
Ø14	65 cm
Ø16	80 cm
Ø18	95 cm
Ø20	110 cm
Ø22	120 cm
Ø24	140 cm
Ø26	150 cm
Ø28	160 cm

SOVRAPPOSIZIONE RETI:
2 maglie min

CARATTERISTICHE DEI CLS A PRESTAZIONE:

Prescritto l'impiego di cemento tipo CEM II 32.5 conforme UNI EN 197-1:2011
Curva granulometrica di Fuller e misurazione degli inerti conforme alla norma UNI EN 933-1:2012

Classe di cloruri CL0.20 (contenuto massimo di cloruri =0.2%)
Come definito da prospetto 15 UN EN EN 206:2016

- LE MISURE SONO ESPRESSE IN cm SALVO DOVE DIVERSAMENTE INDICATO
- LE DIMENSIONI DEI FERRI SONO RIFERITE AL LORO INGOMBRO ESTERNO
- GLI ANGOLI DI SAGOMATURA SONO DI 90° SALVO DIVERSA INDICAZIONE

PARTICOLARE PEGATURE

D=5Ø
FERRI LONGITUDINALI Ø<16

D=8Ø
STAFFE E GANCI Ø≥16

TOLLERANZE GEOMETRICHE E CONTROLLI SUI MATERIALI
Strutture metalliche: UNI EN 1090 - 2:2018 Annesso G
Strutture in C.A.: UNI EN 13670:2010 Annesso G
Controlli sui materiali secondo il D.M. 17-01-2018

0.00 m = Quota finito architettonico

NOTA BENE

- Eseguire prenmontaggi dei telai e delle lamiere in officina.
- Tutte le misure sono da verificare in cantiere.
- L'elaborazione del presente disegno non esonera l'Appaltatore dalla sua responsabilità per errori, omissioni, inesattezze e quant'altro in contrasto con le norme.
- L'Appaltatore è tenuto ad un accurato controllo del disegno e a segnalare eventuali inesattezze, incompletezze o discordanze tra il presente elaborato e una qualsiasi norma di Legge.
- L'Inadempienza a tale vincolo comunerà la relativa e completa responsabilità dell'Appaltatore.

LEGENDA FORI

Foro Ø14mm per M8	Foro Ø22mm per M20
Foro Ø16mm per M8	Foro Ø24mm per M22
Foro Ø13.5mm per M12	Foro Ø26mm per M24
Foro Ø15.5mm per M14	Foro Ø28mm per M27
Foro Ø18mm per M16	Foro Ø30mm per M30
Foro Ø20mm per M18	Foro Ø35mm per M33

interpretazione viste e sezioni secondo proiezione europea

TOLLERANZE GEOMETRICHE

Strutture Metalliche:
UNI EN 1090 - 2:2018 Annesso G
Strutture in CAA - CAP e murature:
UNI EN 13670:2010 Annesso G

Controlli sui materiali secondo il D.M. 17-01-2018

Forature conforme a norma EN 1090-2:2018
NOTA: per strutture a traliccio o piane, tutte le forature indicate dovranno essere ridotte di 0.5mm

PRESCRIZIONI SUI MATERIALI:
ACCIAIO per CARPENTERIA METALLICA:
Acciaio per profili aperti: S275JO
Acciaio per profili tubolari e piastrame: S235J0
Acciaio per bullonerie: classe 8.8 (UNI EN ISO 898-1:2013) usato con grado di protezione: C4-H conforme a UNI EN ISO 1461:2009 e 14713:2017
Tutti i prodotti da costruzione dovranno essere dotati di marchio C.E. ed essere conformi alle Direttive Comunitarie applicabili e/o al Regolamento Europeo n° 305/2011.Consolidare armonizzate per la commercializzazione dei prodotti da costruzione.
Classe di esecuzione per carpenteria metallica UNI EN 1090-2 classe EXC2

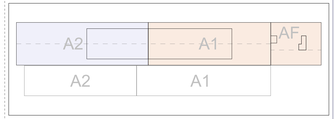
PRESCRIZIONE SUI MEZZI D'UNIONE:
SALDATURE a cordoni d'angolo:
la dimensione del cordone deve non essere inferiore a quella dovuta quanto per la
ESSENDO T1=T2
a1 = 0.7xT1

BULLONI ZINCATI A CALDO:
Vite classe 8.8 (UNI EN ISO 898-1:2013)
Dado tipo 8 (UNI EN ISO 898-2:2012)

Metodologia Assemblaggio Carpenteria

Sistema antisvitamento con rondella Patnut
Rondella piana
Dado preserrato
Rondella piana Patnut
Bullone Serbec
Patnut
Assemblato

Sistema antisvitamento con controdado
Rondella piana
controdado
Assemblato
Bullone Serbec
Dado preserrato



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This plan only valid in connection & coordination with the plans of all other Specialist disciplines, and must be checked for conformity with these plans. Deviations in dimensions must be clarified with the site management.

CLIENT / COMMITTENTE:

STACK INFRASTRUCTURE

STACK MIL07 Datacenter

Via Lombardia, 27010 Siziano PV

BIM Coordinator / Consulente BIM del Cliente
ARC:BIM
2nd Floor, 140 St John Street - London, GB

ARC:BIM

DESIGN TEAM / TEAM DI PROGETTO

CONSULTING DESIGNER / PROGETTISTA

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PROGETTO ARCHITETTONICO
Arch. Daniele De Bettin
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Ing. Sandro Buiatti
DBA S.p.A.
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COORDINATION / COORDINAMENTO
PM - Alessandro Masaro
BIM Manager - S. Di Biase
BIM Coordinator - R. Sodano

INTEGRATED DESIGN / PROGETTAZIONE COORDINATA

DBA S.p.A.
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Via Cadorna 7
20090 S. Donato di Lesmo (MB)
Sede operativa:
Viale Liguria 24 - 20143 Milano
Viale G. G. Felissent 20D - 31027 Vittorio Veneto (TV)
certificata ISO 9001:2015 - RINA - n.IQ0220105 Cl.Max n.11 IAF31

PROJECT CODE	ORIGINATOR	FUNCTIONAL	SPACIAL N.	FORM	DISCIPLINE	TYPE	NUMBER
MIL07	DBA	AZ	RG	DR	S	20	006

NOTES / NOTE:

DBA PROJECT CODE	PROJECT STAGE	STATUS / STATO	REVISION / REVISIONE	DATE / DATA
13038001	WS3	S4	P01	07/11/2025

REV.	Sit. / Rev. 3 Subsidiar	27/11/2025
REV.	REVISION DESCRIPTION / DESCRIZIONE REVISIONE	REVISION DATE

Client / Committente: STACK INFRASTRUCTURE

Oggetto:
Facility A
Piattaforma chillers
Planimetria strutturale
Subject:
Facility A
Gantry roof
Structural plan

SIZE / FORMATO: A0 +2 (841x1189)
SCALE / SCALA: 1:100
DRAWN BY / DISEGNATO DA: A. Aceti
CHECKED BY / CONTROLLATO DA: D. Serafini

FILE NAME / NOME FILE: MIL07-DBA-AZ-RG-DR-S-20006.P01

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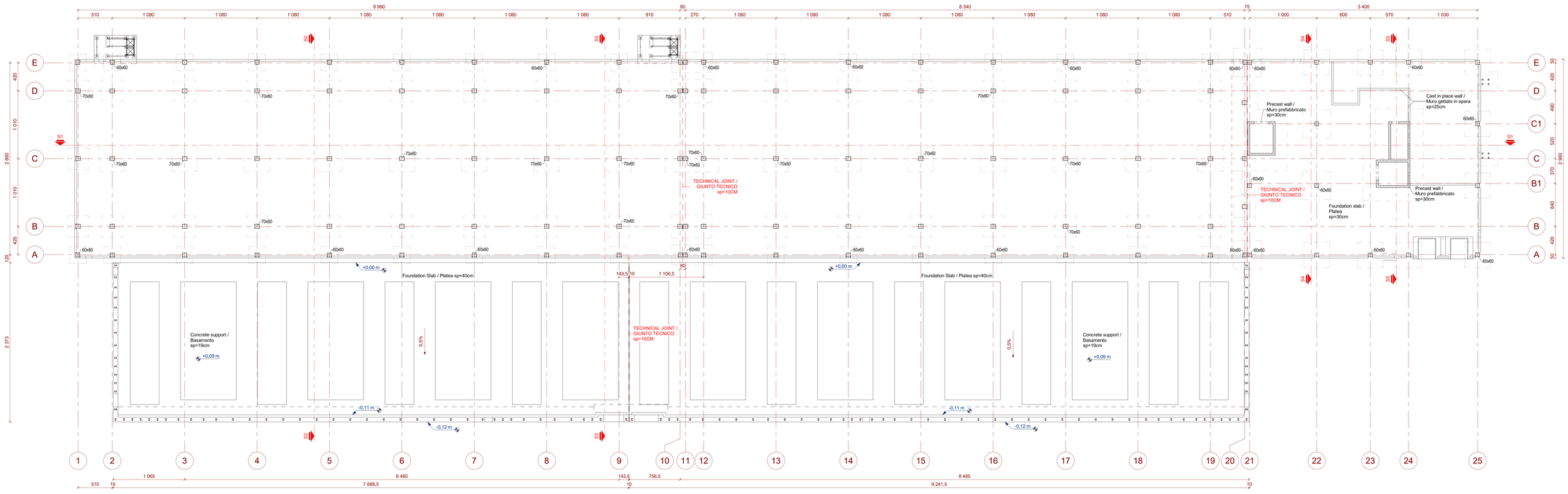
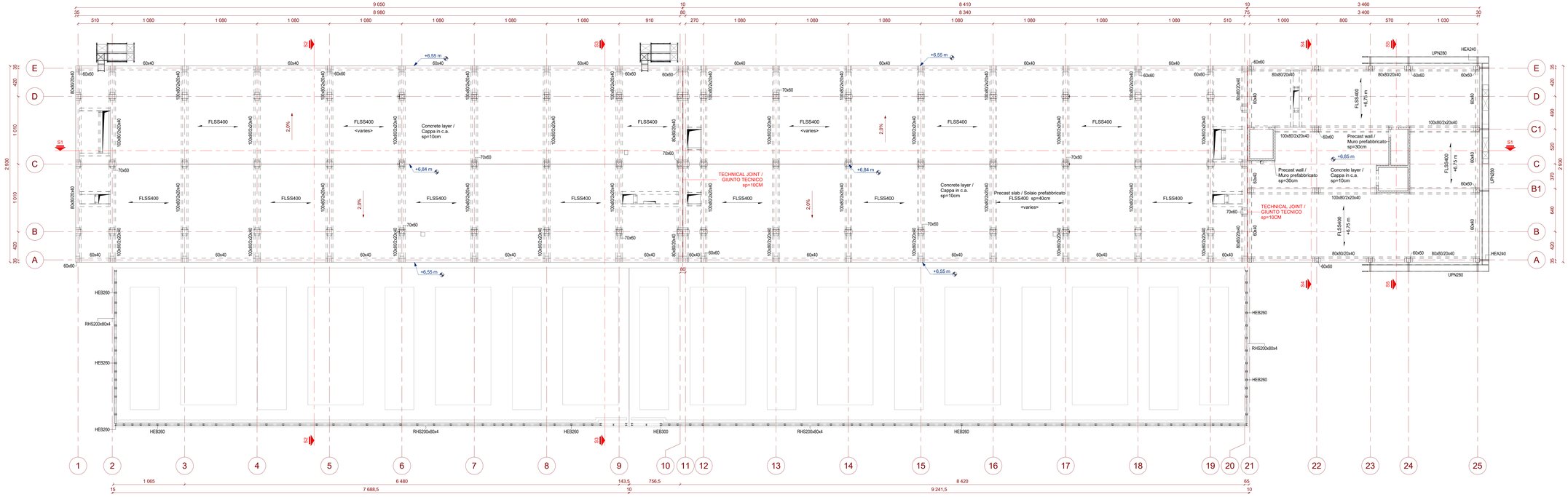


Ground floor (00) / Piano terra (00)

1 : 200

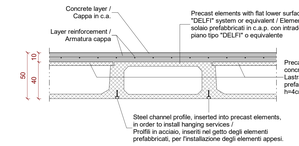


First floor (01) / Primo piano (01)

1 : 200

0 2 4 6 8 10m

TYPICAL "DELFI" SLAB TYPE SECTION - SEZIONE TIPICA SOLAIO TIPO "DELFI"



PRESCRIZIONI SUI MATERIALI:

Tutti i prodotti da costruzione dovranno essere dotati di marchio C.E. ed essere rispondenti alle norme tecniche obbligatorie secondo il Regolamento Europeo n°305/2011 Condizione armonizzate per la commercializzazione dei prodotti da costruzione.
Tutte le strutture hanno caratteristica di resistenza al fuoco REI60.
Calcestruzzo a prestazione garantita in conformità alla UNI 11104:2016

CALCESTRUZZO per MAGRONE
Classe C12/15 Rck=15 MPa fck=12 MPa

CALCESTRUZZO per FONDAZIONI EDIFICIO e INCLUSIONI RIGIDE
Calcestruzzo a prestazione garantita
Classe C32/40 Rck=40 N/mm² fck=25 N/mm²
Classe di esposizione: XC2
Classe di consistenza: S4
Rapporto A/C: 0,60
Dosaggio minimo di cemento: 300 da/kmm³
Diametro nominale massimo inerte: 30 mm
Contenuto cloruri: ≤ 0,20

CALCESTRUZZO per FONDAZIONI AREA GE
Calcestruzzo a prestazione garantita
Classe C32/40 Rck=40 N/mm² fck=25 N/mm²
Classe di esposizione: XC4
Classe di consistenza: S4
Rapporto A/C: 0,50
Dosaggio minimo di cemento: 300 da/kmm³
Diametro nominale massimo inerte: 30 mm
Contenuto cloruri: ≤ 0,20

CALCESTRUZZO per PREFABBRICATI
Calcestruzzo a prestazione garantita
Classe C45/55 Rck=55 N/mm² fck=45 N/mm
Classe di esposizione: XC3
Classe di consistenza: –
Rapporto A/C: –
Dosaggio minimo di cemento: – da/kmm³
Diametro nominale massimo inerte: 20 mm
Contenuto cloruri: ≤ 0,20

ACCIAIO per opere in C.A. ad aderenza migliorata: B450C
$f_{yk,nom}$ 450 MPa (valore nominale della tensione caratteristica a snervamento)
$f_{tk,nom}$ 540 MPa (valore nominale della tensione caratteristica a rottura)

IN CASO DI SPOSTAMENTI O NUOVI INSERIMENTI, DI SCARICHI ED OGNI ALTRA OPERA DI ATTINENZEMENTO DELLE FONDAZIONI O MURATURE, CONTATTARE PREVENTIVAMENTE LA DIREZIONE LAVORI DELLE OPERE STRUTTURALI. CONTROLLARE TUTTE LE MISURE IN CANTIERE

PRESCRIZIONI D'ESECUZIONE DELLE OPERE:

COPRIFERRO MINIMO:
Strutture di fondazione: *4 cm* — Ø12 a s 85 cm; Ø14 a s 100 cm
Strutture di elevazione: *4 cm* — Ø16 a s 110 cm; Ø18 a s 120 cm; Ø20 a s 140 cm; Ø24 a s 160 cm; Ø26 a s 180 cm

LUNGHEZZA DI SOVRAPPOSIZIONE: s= 70Ø

SOVRAPPOSIZIONE RETE: 2 maglie min.

CARATTERISTICHE DEI CLS A PRESTAZIONE:

Prescritto l'impiego di cemento tipo CEM II 32.5 conforme UNI EN 197-1:2011
Curva granulometrica di Fuller e misurazione degli inerti conforme alla norma UNI EN 933-1:2012

Classe di cloruri CL0.20 (contenuto massimo di cloruri <0.2%) Come definito da prospetto 15 UNI EN 206:2016

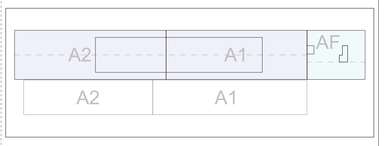
- LE MISURE SONO ESPRESSE IN cm SALVO DOVE DIVERSAMENTE INDICATO
- LE DIMENSIONI DEI FERRI SONO RIFERITE AL LORO INGOMBRO ESTERNO
- GLI ANGOLI DI SAGOMATURA SONO DI 90° SALVO DIVERSA INDICAZIONE

PARTICOLARE PIEGATURE

D=7Ø — FERRI LONGITUDINALI Ø>16
D=4Ø — STAFFE E GANCI Ø≤16

TOLLERANZE GEOMETRICHE E CONTROLLI SUI MATERIALI
Strutture metalliche: UNI EN 1090 - 2:2018 Annesso B
Strutture in CAN - CAP: UNI EN 13670:2010 Annesso G
Controlli sui materiali secondo il D.M. 17-01-2018

0.00 m = Quota finito architettonico



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CLIENT / COMMITTENTE:

STACK INFRASTRUCTURE

Project name / Progetto
STACK MIL07 Datacenter

Location / Indirizzo progetto:
Via Lombardia, 27010 Siziano PV

BIM Client Consultant / Consulente BIM del Cliente
ARC:BIM
2nd Floor, 140 St John Street - London, GB

DESIGN TEAM / TEAM DI PROGETTO

CONSULTING DESIGNER / PROGETTISTA

ARCHITECTURAL DESIGN / PROGETTO ARCHITETTONICO
Arch. Daniele De Bettin
DBA S.p.A.
Viale Liguria 24, Milano (MI)

STRUCTURAL DESIGN / PROGETTO STRUTTURE
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DBA S.p.A.
Viale G. G. Felissent 20D, Villorba (TV)

MECHANICAL DESIGN / PROGETTO IMP. MECCANICI ED ELETTRICI
Ing. Sacha Buselli
DBA S.p.A.
Via Natale Battaglia 10, Milano (MI)

ELECTRICAL DESIGN / PROGETTO IMP. ELETTRICI E SPECIALI
Ing. Sacha Buselli
DBA S.p.A.
Via Natale Battaglia 10, Milano (MI)

COORDINATION / COORDINAMENTO
PM - *Alessandro Masiero*
BIM Manager - *S. Di Biase*
BIM Coordinator - *R. Sodano*

INTEGRATED DESIGN / PROGETTAZIONE COORDINATA

DBA S.p.A.
Sede legale
Piazza Maria, 19
32043 S. Stefano di Cadore (BL)
Sede secondaria
Viale Felissent, 20/D
31020 Villorba (TV)
Società di ingegneria certificata **ISO 9001:2015** RINA: n.IQ0220-15 Cdna: n.17-1083-S

PROJECT CODE	ORIGINATOR	FUNCTIONAL	SPACIAL B.	FORM	DISCIPLINE	TYPE	NUMBER
MIL07	DBA	AZ	ZZ	DR	S	20	001

NOTES / NOTE:

DBA PROJECT CODE	PROJECT STAGE	STATUS / STATO	REVISION / REVISIONE	DATE / DATA
13038001	WS3	S4	P01	07/11/2025

REV.	REVISION DESCRIPTION - DESCRIZIONE REVISIONE	REVISION DATE
SI – Wbs 3 Submittal		2011/12/05

Client / Committente: STACK INFRASTRUCTURE

Oggetto:
Facility A
Planimetria strutturale
Panoramica piano terra e primo piano

Subject:
Facility A
Structural plan
Ground Floor and First Floor Overview

SIZE / FORMATO: A0 +1 (841*1189)
SCALE / SCALA: 1:200
DRAWN / DISEGNATO: A. Aceti
CHECKED / CONTROLLATO: E. Baraldin
APPROVED / APPROVATO: D. Serafini

FILE NAME / NOME FILE: MIL07-DBA-AZ-ZZ-DR-S-20001.P01

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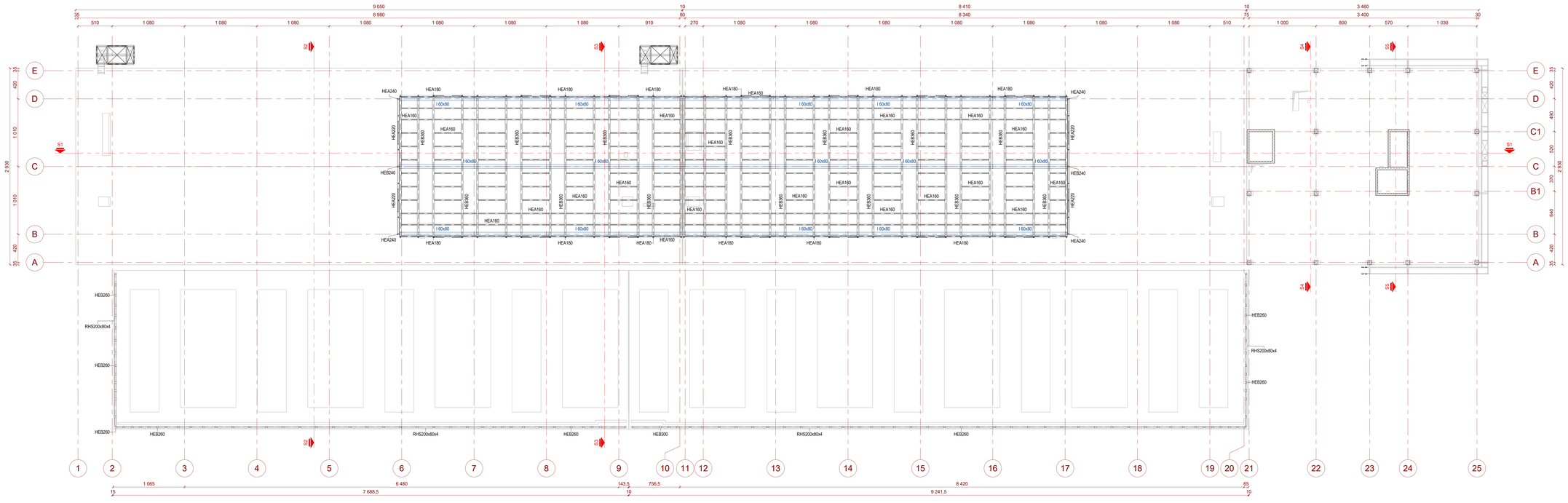
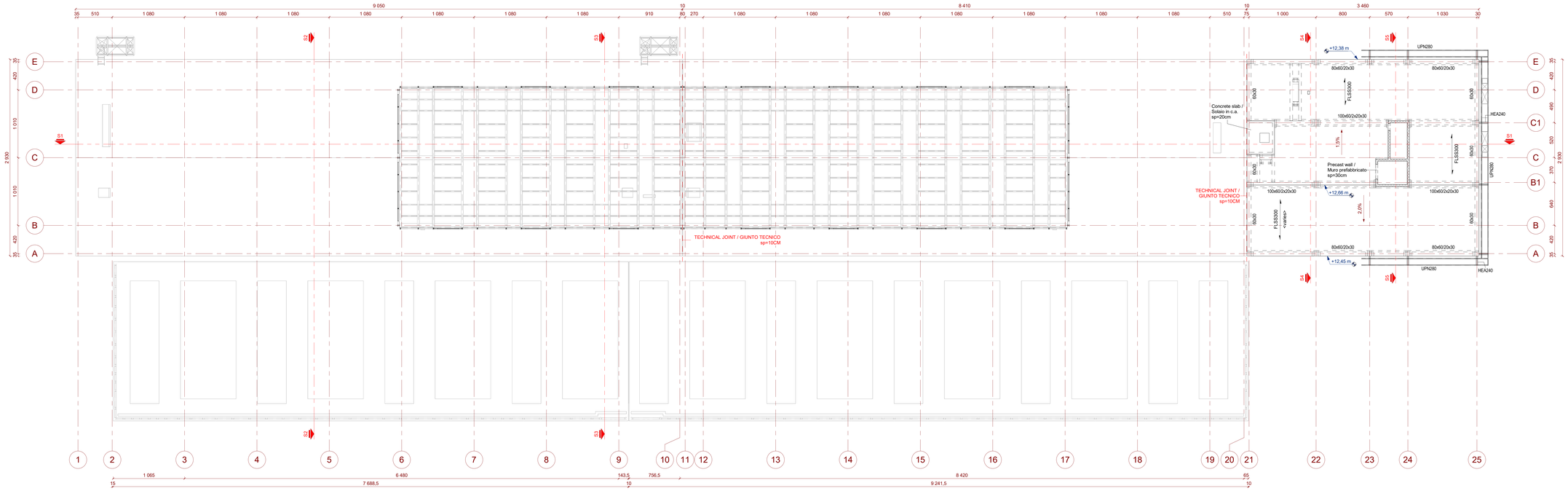


Roof gantry (RG) / Piattaforma chillers (RG)

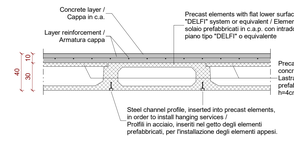
1 : 200



Office roof (RF) / Tetto uffici (RF)

1 : 200

TYPICAL "DELFI" SLAB TYPE SECTION -
SEZIONE TIPICA SOLAIO TIPO "DELFI"



NOTA BENE

- Eseguire premontaggi del telai e delle lamiere in officina.
- Rispettare le quote di progetto e di cantiere.
- L'elaborazione del presente disegno non esonera l'Appaltatore dalla sua responsabilità per eventuali errori e omissioni e/o, comunque, per i vizi delle opere.
- L'Appaltatore è tenuto ad un accurato controllo del disegno e a segnalare eventuali inesattezze, incompletezze o discordanze tra il presente elaborato e una qualsiasi norma di Legge.
- L'inadempienza a tale obbligo comporterà la relativa e completa responsabilità dell'Appaltatore.

LEGENDA FORI

- Foro Ø7mm per M6
- Foro Ø9mm per M8
- Foro Ø13.5mm per M12
- Foro Ø15.5mm per M14
- Foro Ø18mm per M16
- Foro Ø20mm per M18
- Foro Ø22mm per M20
- Foro Ø24mm per M22
- Foro Ø26mm per M24
- Foro Ø30mm per M27
- Foro Ø33mm per M30
- Foro Ø36mm per M33

Forature conformi a norma EN 1090-2:2018
NOTA: per strutture a traliccio e piane, tutte le forature indicate dovranno essere ridotte di 0.5mm

interpretazione viste e sezioni secondo proiezione europea

TOLLERANZE GEOMETRICHE

Strutture Metalliche:
UNI EN 1090 - 2:2018 Annesso D
Strutture in CAN - CAP e murature:
UNI EN 13670:2010 Annesso G

Controlli sui materiali secondo il D.M. 17-01-2018

PRESCRIZIONI SUI MATERIALI:

ACCIAIO per CARPENTERIA METALLICA:
Acciaio per profili aperti S275J0
Acciaio per profili cavi e piastrame S355J0H
Trattamento protettivo superficiale di zincatura a caldo con grado di protezione C4-H conforme a UNI EN ISO 1461:2009 e 14713:2017

Tutti i prodotti da costruzione dovranno essere dotati di marchio C.E. ed essere conformi alle Norme Europee, con particolare riferimento al Regolamento Europeo n° 305/2011. Condizioni armonizzate per la commercializzazione dei prodotti da costruzione.
Classe di esecuzione per carpenteria metallica UNI EN 1090-2 classe EXC3

PRESCRIZIONE SUI MEZZI D'UNIONE:

SALDATURE
a cordoni d'angolo:

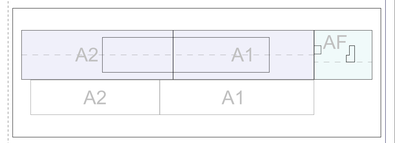
BULLONI ZINCATI A CALDO

Vite classe 8.8 (UNI EN ISO 898-1:2013)
Dado tipo 8 (UNI EN ISO 898-2:2012)

Metodologia Assemblaggio Carpenteria

Sistema antisvitamento con rondella Patnut

Sistema antisvitamento con controdado



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CLIENT / COMMITTENTE:

STACK INFRASTRUCTURE

Progetto / Project:
STACK MIL07 Datacenter

Location / Indirizzo progetto:
Via Lombardia, 27010 Siziano PV

BIM Client Coordinator / Consulente BIM del Cliente
ARC:BIM
2nd Floor, 140 St John Street - London, GB

ARC:BIM

DESIGN TEAM / TEAM DI PROGETTO

CONSULTING DESIGNER / PROGETTISTA

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PROGETTO ARCHITETTONICO
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COORDINATION / COORDINAMENTO
PM - *Alessandro Masiero*
BIM Manager - *S. Di Biase*
BIM Coordinator - *R. Sodano*

INTEGRATED DESIGN / PROGETTAZIONE COORDINATA

DBA

DBA S.p.A.
Sede legale:
Piazza Maria, 19
32043 S. Stefano di Cadore (BL)
P.IVA 01032140255
certificata ISO 9001:2015 RINA: n.9232/97/S Cofrac n.IT-1908/10

Sede secondaria:
Viale Felissent, 20/D
31020 Villorba (TV)
Tel. +39 0422 1710500

PROJECT CODE	ORIGINATOR	FUNCTIONAL	SPACIAL B.	FORM	DISCIPLINE	TYPE	NUMBER
MIL07	DBA	AZ	ZZ	DR	S	20	002

NOTES / NOTE:

DBA PROJECT CODE	PROJECT STAGE	STATUS / STATO	REVISION / REVISIONE	DATE / DATA
13038001	WS3	S4	P01	07/11/2025

REV.	REVISION DESCRIPTION - DESCRIZIONE REVISIONE	REVISION DATE
Client / Committente	STACK INFRASTRUCTURE	

Oggetto:
Facility A
Planimetria strutturale
Panoramica Piattaforma Chillers e Tetto Uffici
Subject:
Facility A
Structural plan
Roof Gantry and Second Roof Level Overview

SIZE / FORMATO: A0 +1 (841*1188)
SCALE / SCALA: 1:200
DRAWN / DISEGNATO: A. Aceti
CHECKED / CONTROLLATO: E. Baraldin
APPROVED / APPROVATO: D. Serafini

FILE NAME / NOME FILE: MIL07-DBA-AZ-ZZ-DR-S-20002.P01

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DBA S.p.A. - Sede Legale Piazza Maria, 19 - 32043 S. Stefano di Cadore (BL) - Sede secondaria: Viale Felissent, 20/D - 31020 Villorba (TV) - Tel. +39 0422 1710500 - www.dbaeng.com
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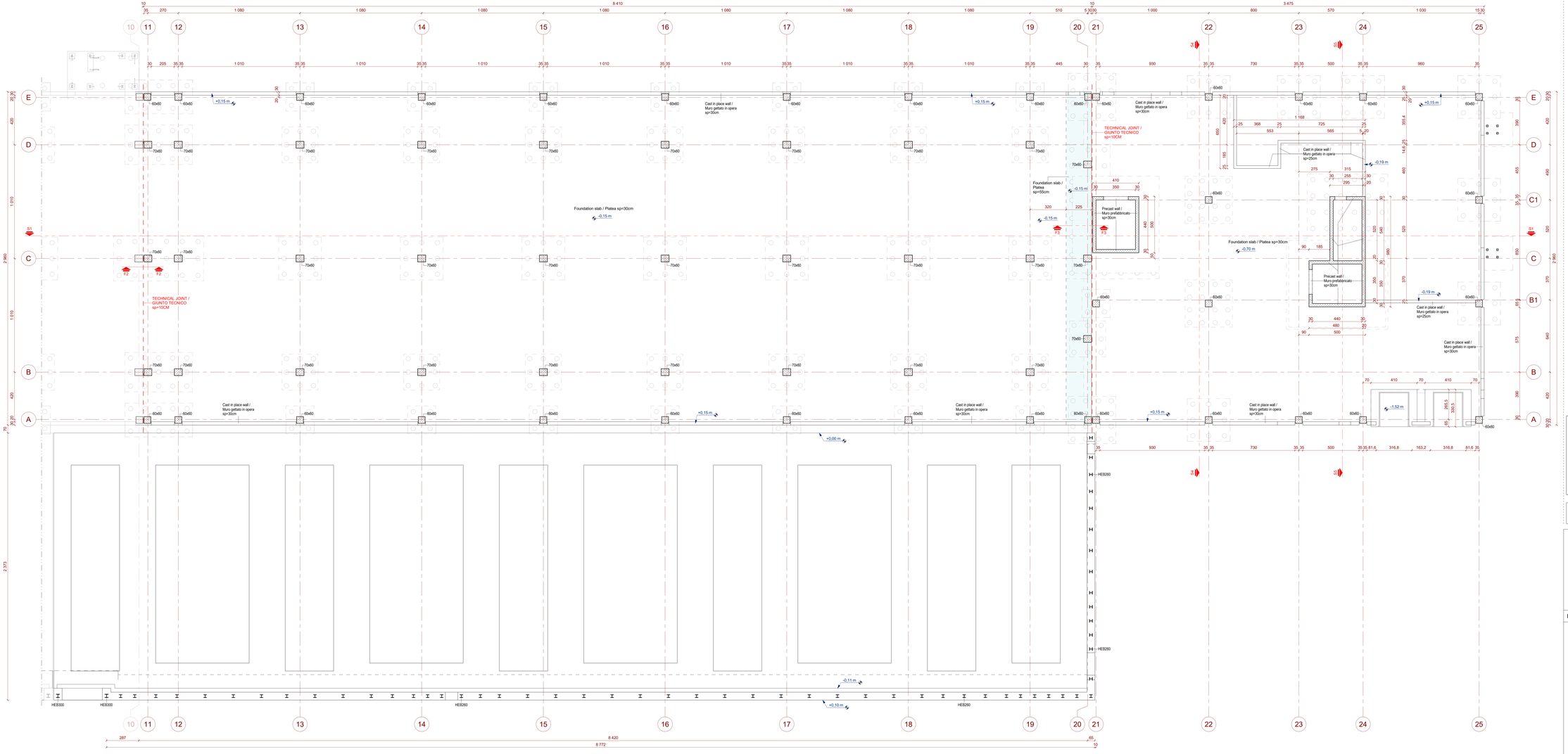


PRESCRIZIONI SUI MATERIALI:

Tutti i prodotti da costruzione dovranno essere dotati di marchio C.E. ed accompagnati da la documentazione prevista dalla direttiva CE secondo il Regolamento Europeo n° 305/2011 Condizioni armonizzate per la commercializzazione dei prodotti da costruzione.
Tutti i materiali dovranno rispondere alle norme vigenti al fuoco REI60.
Calcestruzzo a prestazione garantita in conformità alla UNI 11104:2016

CALCESTRUZZO per MAGRONE
Classe C12/15 Rck=15 MPa fck=12 MPa

CALCESTRUZZO per FONDAZIONI EDIFICIO e INCLUSIONI RIGIDE
Calcestruzzo a prestazione garantita
Classe C25/30 Rck=30 N/mm² fck=25 N/mm²
Classe di esposizione: XC2
Classe di consistenza: S4
Rapporto A/C: 0.60
Dosaggio minimo di cemento: 300 daN/mc*
Diametro nominale massimo inerte: 30 mm
Contenuto cloruri: ≤0.20

CALCESTRUZZO per FONDAZIONI AREA GE
Calcestruzzo a prestazione garantita
Classe C32/40 Rck=40 N/mm² fck=32 N/mm²
Classe di esposizione: XC2
Classe di consistenza: S4
Rapporto A/C: 0.50
Dosaggio minimo di cemento: 300 daN/m³
Diametro nominale massimo inerte: 30 mm
Contenuto cloruri: ≤0.20

CALCESTRUZZO per PREFABBRICATI
Calcestruzzo a prestazione garantita
Classe C32/40 Rck=40 N/mm² fck=32 N/mm
Classe di esposizione: XC3
Classe di consistenza: –
Rapporto A/C: –
Dosaggio minimo di cemento: – daN/m³
Diametro nominale massimo inerte: 20 mm
Contenuto cloruri: ≤0.20

ACCIAIO per opere in C.A. ad aderenza migliorata: B450C
$f_{yk,nom}$ 450 MPa (valore nominale della tensione caratteristica a snervamento)
$f_{tk,nom}$ 540 MPa (valore nominale della tensione caratteristica a rottura)

IN CASO DI SPOSTAMENTI O NUOVI INSERIMENTI, DI SCARICHI ED OGNI ALTRA OPERA DI ATTRAVERSAMENTO DELLE FONDAZIONI O MURATURE, CONTATTARE PREVENTIVAMENTE LA DIREZIONE LAVORI DELLE OPERE STRUTTURALI, CONTROLLARE TUTTE LE MISURE IN CANTIERE.

PRESCRIZIONI D'ESECUZIONE DELLE OPERE:

COPRIFERRO MINIMO
Struttura di fondazione: 4 cm
Strutture di elevazione: 4 cm

LUNGHEZZA DI SOVRAPPOSIZIONE
Ø12 o ≤ 85 cm
Ø14 o ≤ 100 cm
Ø16 o ≤ 115 cm
Ø18 o ≤ 125 cm
Ø20 o ≤ 140 cm
Ø24 o ≤ 165 cm
Ø26 o ≤ 180 cm

s= 700

SOVRAPPOSIZIONE RETE:
2 maglie min.

CARATTERISTICHE DEI CLS A PRESTAZIONE:

Prescritto l'impiego di cemento tipo CEM II 32.5 conforme alla UNI EN 197-1
Curva granulometrica di Fuller e misurazione degli inerti conforme alla norma UNI EN 933-1:2012

Classe di cloruri CLS.20 (contenuto massimo di cloruri =0.2%)
Come definito da prospetto 15 UNI EN 206:2016

- LE MISURE SONO ESPRESSE IN cm SALVO DOVE DIVERSAMENTE INDICATO.
- LE QUOTE ALTIMETRICHE SONO RIFERITE AL LORO INGOMBRO ESTERNO.
- GLI ANGOLI DI SAGOMATURA SONO DI 90° SALVO DIVERSA INDICAZIONE

PARTICOLARE PEGATURE

D=12
EGRB LONGITUDINALI d>16

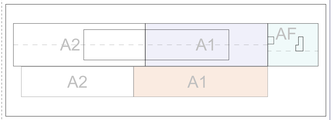
D=8P
STAFFE E GANCI d≤16

TOLLERANZE GEOMETRICHE E CONTROLLI SUI MATERIALI
Strutture metalliche: UNI EN 1090 - 2:2018 Annesso B
Strutture in C.A.: UNI EN 13670:2010 Annesso G
Controlli sui materiali secondo il D.M. 17-01-2018

0.00 m = Quota finito architettonico

The compatted backfilling should reach the following resistance characteristics:
- Deformation modulus E_{v2}>80MPa according to french plate test
- Compaction ratio E_{v2} / E_{v1} < 2

Il riempimento compattato dovrebbe rispondere ai seguenti requisiti:
- Modulo di deformazione E_{v2}≥80MPa secondo la prova su piastra alla francese
- Rapporto di compattazione E_{v2} / E_{v1} < 2



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CLIENT / COMMITTENTE:

STACK INFRASTRUCTURE

STACK MIL07 Datacenter

Via Lombardia, 27010 Siziano PV

BIM Project Manager / Consulente BIM del Cliente
ARC:BIM
2nd Floor, 140 St John Street - London, GB

ARC:BIM

DESIGN TEAM / TEAM DI PROGETTO

CONSULTING DESIGNER / PROGETTISTA

ARCHITECTURAL DESIGN /
PROGETTO ARCHITETTONICO
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PROGETTO IMP. MECCANICI ED ELETTRICI
Ing. Sandro Busetti
DBA S.p.A.
Via Natale Battaglia 10, Milano (MI)

ELECTRICAL DESIGN /
PROGETTO IMP. ELETTRICI E SPECIALI
Ing. Sandro Busetti
DBA S.p.A.
Via Natale Battaglia 10, Milano (MI)

COORDINATION / COORDINAMENTO
PM - *Alessandro Masaro*
BIM Manager - *S. Di Biase*
BIM Coordinator - *R. Sodero*

INTEGRATED DESIGN / PROGETTAZIONE COORDINATA

DBA

DBA S.p.A.
Sede legale:
Via Natale Battaglia 10
20127 S. Donato di Lecco (BL)
P.IVA/C.F. 02396970125
certificata ISO 9001:2015 - RINA n. 9105julo0015 Cclass n.11-11881/c

Sede secondaria:
Viale Liguria 24 - 20143 Milano (MI)
Viale G. G. Felissent 20D - 31029 Vittorio Veneto (TV)

PROJECT CODE	ORIGINATOR	FUNCTIONAL	SPACIAL S.	FORM	DISCIPLINE	TYPE	NUMBER
MIL07	DBA	ZZ	00	DR	S	20	004

NOTES / NOTE:

DBA PROJECT CODE	PROJECT STAGE	STATUS / STATO	REVISION / REVISIONE	DATE / DATA
13038001	WS3	S4	P01	07/11/2025

REV.	REVISION DESCRIPTION / REVISIONE REVISIONE	REVISION DATE
P01	S4 - Rilx 3 Subcontractor	07/11/2025

Client / Committente: STACK INFRASTRUCTURE

Oggetto:
Facility A
Piano terra
Planimetria strutturale (2/2)
Subject:
Structural
Ground floor
Structural plan (2/2)

SIZE / FORMATO: A0 +2 (841 x 1189)
SCALE / SCALA: 1:100
DRAWN BY / DISEGNATO DA: A. Acati
CHECKED BY / CONTROLLATO DA: E. Barattin
APPROVED BY / APPROVATO DA: D. Serafini

FILE NAME / NOME FILE: MIL07-DBA-ZZ-00-DR-S-20004.P01

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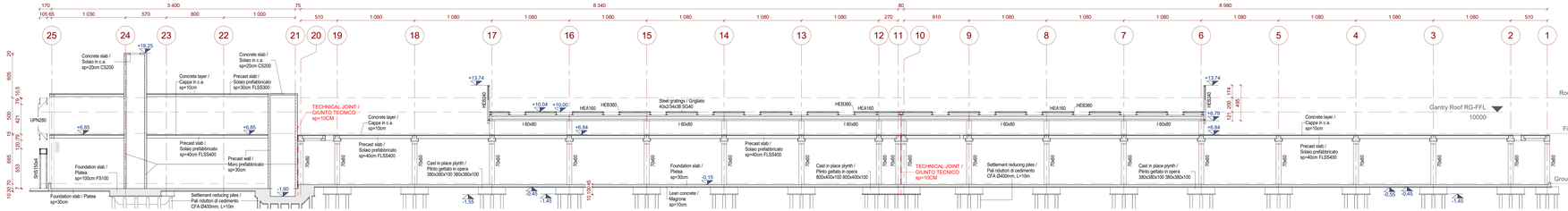

Section S1-S1 / Sezione S1-S1

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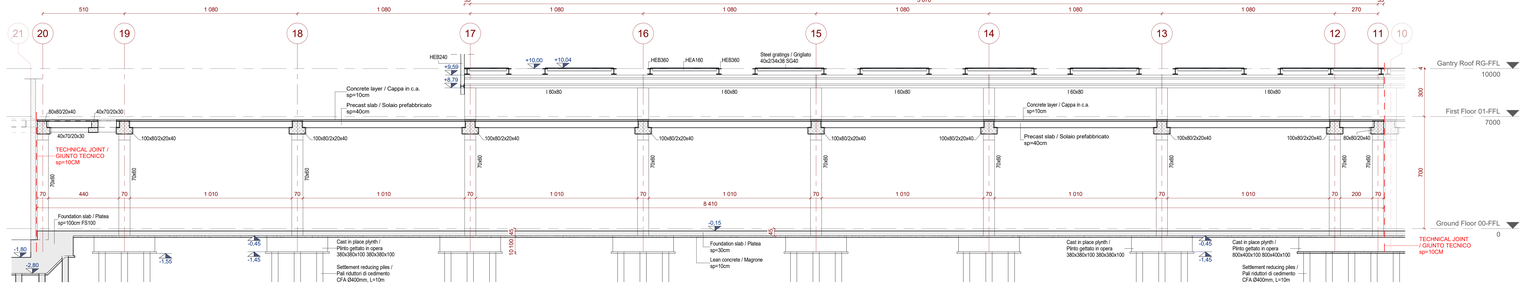

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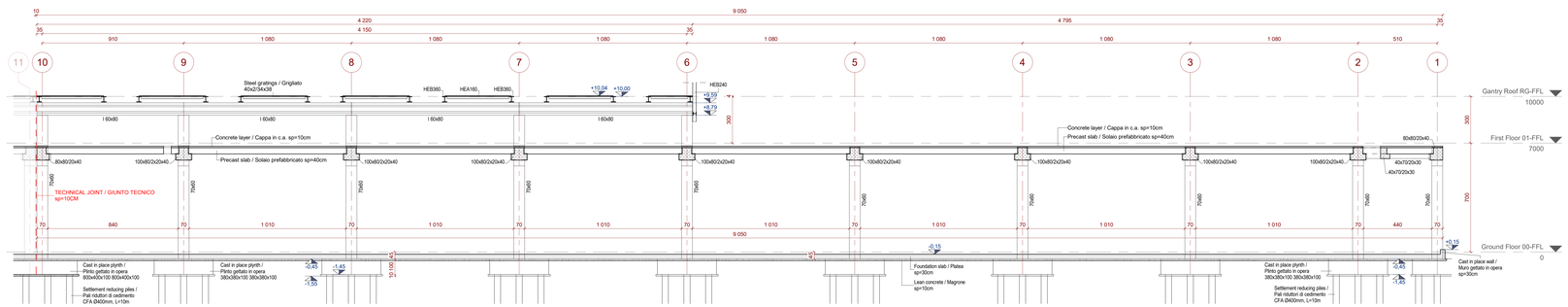

Section S1-S1 DC1 / Sezione S1-S1 DC1

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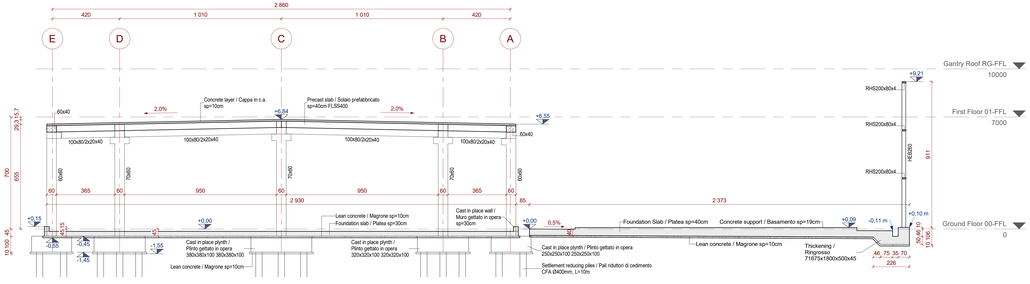
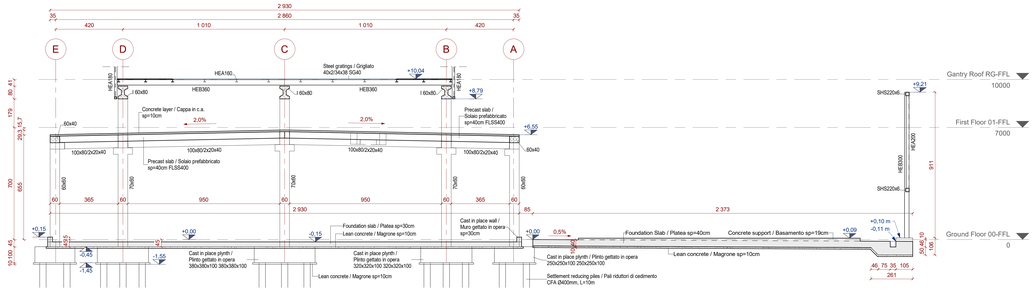


Section S2.S2 / Sezione S2-S2

1 : 100



Section S3.S3 / Sezione S3-S3

1 : 100

NOTA BENE

- Eseguire prenotazioni dei telai e delle lamiere in officina.
- Le Quote hanno la precedenza sugli ingrandimenti.
- L'Aggiudicatario del presente disegno non esonera l'Appaltatore dalla sua responsabilità per eventuali errori e omissioni etc. comunque, per i cui dette opere.
- Il Disegnatore, non è, in alcun caso, responsabile per danni o ingiustificate eventuali inesattezze, incompletezze o discordanze tra il presente elaborato e una qualsiasi norma di Legge.
- L'Inadempienza a tale obbligo comporterà la relativa e completa responsabilità dell'Appaltatore.

LEGENDA FORI

- Foro Ø7mm per M6
- Foro Ø9mm per M8
- Foro Ø13 5mm per M10
- Foro Ø15 5mm per M14
- Foro Ø18mm per M16
- Foro Ø22mm per M20
- Foro Ø22mm per W22
- Foro Ø24mm per W22
- Foro Ø26mm per W24
- Foro Ø28mm per W27
- Foro Ø30mm per W30
- Foro Ø33mm per W33

interpretazione viste e sezioni secondo proiezione europea

TOLLERANZE GEOMETRICHE

Strutture Metalliche:
UNI EN 1090 - 2:2018 Annesso D
Strutture in CAP - UNI EN 13670:2010
UNI EN 13670:2010 Annesso G

Controlli sui materiali secondo il D.M. 17-01-2018

Foratura conforme a norma EN 1090-2:2018
NOTA: per chiusura bullonato ordinario: fulle le forature indicate dovranno essere ridotte di 0.5mm

PRESCRIZIONE SUI MATERIALI

ACCIAIO per CARPENTERIA METALLICA:
Acciaio per profili aperti: S275JR
Acciaio per profili tubolari e piastrame: S235J0
Trattamento protettivo superficiale di zincatura a caldo secondo UNI EN ISO 1461:2009 e verniciatura secondo UNI EN ISO 14713:2009 e 14713:2017

Tutti i prodotti da costruzione dovranno essere dotati di marchio C.E. ed essere conformi alle Norme Europee, con particolare riferimento al Regolamento Europeo n° 305/2011. Condizione armonizzate per la commercializzazione dei prodotti da costruzione.
Tutte le strutture hanno caratteristica di resistenza al fuoco R240.
Calcestruzzo a prestazione garantita in conformità alla UNI 11104:2016

CALCESTRUZZO per MAGRONE
Classe C12/15 Rck=15 MPa 5a(+1) MPa

CALCESTRUZZO per FONDAZIONI EDIFICIO e INCLUSION RIGIDE
Calcestruzzo a prestazione garantita
Classe di resistenza: C25/30 Rck=30 N/mm²
Classe di esposizione: XC2
Classe di consistenza: S4
Rapporto A/C: 0.60
Dosaggio minimo di cemento: 300 da/m³
Diametro nominale massimo inerti: 30 mm
Contenuto cloruri: ≤ 0.20

CALCESTRUZZO per FONDAZIONI AREA GE
Calcestruzzo a prestazione garantita
Classe di resistenza: C32/40 Rck=40 N/mm²
Classe di esposizione: XC4
Classe di consistenza: S4
Rapporto A/C: 0.50
Dosaggio minimo di cemento: 300 da/m³
Diametro nominale massimo inerti: 30 mm
Contenuto cloruri: ≤ 0.20

CALCESTRUZZO per PREFABBRICATI:
Calcestruzzo a prestazione garantita
Classe C45/55 Rck=55 N/mm Rck=55 N/mm
Classe di esposizione: XC3
Classe di consistenza: S4
Rapporto A/C: 0.45
Dosaggio minimo di cemento: - da/m³
Diametro nominale massimo inerti: 20 mm
Contenuto cloruri: ≤ 0.20

ACCIAIO per opere in C.A. ad aderenza migliorata: B450C
Tensione di snervamento caratteristica (valore minimo garantito): f_{yk} = 450 MPa
Tensione: 540 MPa valore nominale della tensione caratteristica a rottura: f_{tk} = 540 MPa

Metodologia Assemblaggio Carpenteria

Sistema antisvitamento con rondella Painut

Sistema antisvitamento con controdado

SALDATURE
Il cordone d'angolo:

a = 0.7xt
z = 1.4xa

BULLONI ZINCATI A CALDO:
Vite classe 8.8 (UNI EN ISO 898-1:2013)
Dado tipo 8 (UNI EN ISO 898-2:2012)

PRESCRIZIONI SUI MATERIALI:

Tutti i prodotti da costruzione dovranno essere dotati di marchio C.E. ed essere conformi alle Norme Europee, con particolare riferimento al Regolamento Europeo n° 305/2011. Condizione armonizzate per la commercializzazione dei prodotti da costruzione.
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Calcestruzzo a prestazione garantita in conformità alla UNI 11104:2016

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Classe C12/15 Rck=15 MPa 5a(+1) MPa

CALCESTRUZZO per FONDAZIONI EDIFICIO e INCLUSION RIGIDE
Calcestruzzo a prestazione garantita
Classe di resistenza: C25/30 Rck=30 N/mm²
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Tensione di snervamento caratteristica (valore minimo garantito): f_{yk} = 450 MPa
Tensione: 540 MPa valore nominale della tensione caratteristica a rottura: f_{tk} = 540 MPa

PRESCRIZIONI D'ESECUZIONE DELLE OPERE:

CORPRIFERRO MINIMO:
Strutture di fondazione: 4 cm — Ø12 x ≥ 65 cm
Strutture di elevazione: 4 cm — Ø12 x ≥ 115 cm
Ø14 x ≥ 125 cm
Ø16 x ≥ 135 cm
Ø20 x ≥ 150 cm
Ø24 x ≥ 160 cm
Ø26 x ≥ 180 cm

LUNGHEZZA DI SOVRAPPOSIZIONE

SOVRAPPOSIZIONE RETE:
2 maglie min

CARATTERISTICHE DEI CLS A PRESTAZIONE:

Prescritto l'impiego di cemento tipo CEM II 32.5 conforme UNI EN 197-1:2011.
Confezionato con impianto di Fuller e rimozione degli inerti conforme alla norma UNI EN 933-1:2012

Classe di cloruri CL0.20 (contenuto massimo di cloruri =0.2%)
Come definito da prospetto 15 UNI EN 206:2016

- LE MISURE SONO ESPRESSE IN cm SALVO DOVE DIVERSAMENTE INDICATO.
- LE COTE DEGLI ELEMENTI SONO RIFERITE AL LORO ASSE GEOMETRICO.
- GLI ANGOLI DI SAGOMATURA SONO DI 90° SALVO DIVERSA INDICAZIONE

PARTICOLARE PEGATURE

D=72	D=62
FERRI LONGITUDINALI d=16	STAFFE E GANCI d=16

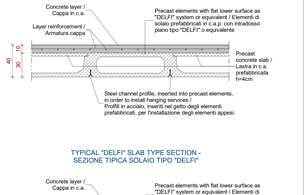
IN CASO DI SPOSTAMENTI O NUOVI INSERIMENTI, DI SCARICHI ED OGNI ALTRA OPERA DI ATTRAVERSAMENTO DELLE STRUTTURE CHE NON SIANO RIPORTATI NEI DISEGNI, IMMEDIATAMENTE LA DIREZIONE LAVORI DELLE OPERE STRUTTURALI, CONTROLLARE TUTTE LE MISURE IN CANTIERE

TOLLERANZE GEOMETRICHE E CONTROLLI SUI MATERIALI
Strutture metalliche: UNI EN 1090 - 2:2018 Annesso B
Strutture in CAP - CAP - UNI EN 13670:2010 Annesso G
Controlli sui materiali secondo il D.M. 17-01-2018

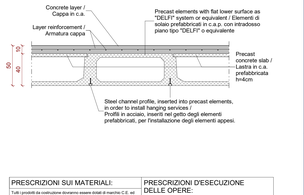
0.00 m = Quota finito architettonico

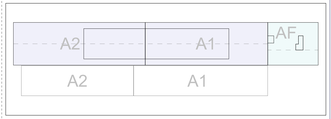
0.00 m

TYPICAL "DELFI" SLAB TYPE SECTION - SEZIONE TIPICA SOLAIO TIPO "DELFI"



TYPICAL "DELFI" SLAB TYPE SECTION - SEZIONE TIPICA SOLAIO TIPO "DELFI"





If presente elaborato è valido solo in coordinamento con tutte le altre discipline specialistiche con le quali deve essere verificata la conformità. Tutte le misure ed eventuali variazioni rispetto al presente elaborato devono essere verificate in cantiere.
This plan only valid in connection & coordination with the plans of all other Specialist disciplines, and must be checked for conformity with these plans. Deviations in dimensions must be clarified with the site management.

CLIENT / COMMITTENTE:

STACK INFRASTRUCTURE

STACK MIL07 Datacenter

Via Lombardia, 27010 Siziano PV

DBA Design Studio / Consulente BIM del Cliente
ARC:BIM
2nd Floor, 140 St John Street - London, GB

ARC:BIM

DESIGN TEAM / TEAM DI PROGETTO

CONSULTING DESIGNER / PROGETTISTA

ARCHITECTURAL DESIGN / PROGETTO ARCHITETTONICO
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DBA S.p.A.
Viale Liguria 24, Milano (MI)

STRUCTURAL DESIGN / PROGETTO STRUTTURE
Ing. Diego Serafini
DBA S.p.A.
Viale G. G. Felissent 20D, Vittorio (TV)

MECHANICAL DESIGN / PROGETTO IMP. MECCANICI ED ELETTRICI
Ing. Sandro Busetti
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Ing. Sandro Busetti
DBA S.p.A.
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COORDINATION / COORDINAMENTO
PM - Alessandro Masaro
BIM Manager - S. Di Biase
BIM Coordinator - R. Sodero

INTEGRATED DESIGN / PROGETTAZIONE COORDINATA

DBA
DBA S.p.A.
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Via Lombardia, 27
20060 S. Gervasio di Cassina dè Pecchi (Mi.)
Sede secondaria:
Viale Liguria, 24
20144 Milano (MI)
certificata ISO 9001:2015 - RINA - n.IQNET/15 12Mod n.11 1981IQ

PROJECT CODE	ORIGINATOR	FUNCTIONAL	SPACIAL S.	FORM	DISCIPLINE	TYPE	NUMBER
MIL07	DBA	ZZ	ZZ	DR	S	20	008

NOTES / NOTE:

DBA PROJECT CODE	PROJECT STAGE	STATUS / STATO	REVISION / REVISIONE	DATE / DATA
13038001	WS3	S4	P01	07/11/2025

REV.	Stat.	Rifer.	Autorizzato	DATE/DATA
P01	S4	Rifer.	E. Barattin	07/11/2025

REVISION DESCRIPTION / DESCRIZIONE REVISIONE: STACK INFRASTRUCTURE

Client / Committente

Oggetto:
Facility A

Subject:
Facility A

Sezioni - S1-S1, S2-S2, S3-S3

Sections - S1-S1, S2-S2, S3-S3

PAPER SIZE / FORMATO	A0 +2 (841*1682)
SCALE / SCALA	1:200-1:100
DRAWN BY / DISEGNATO DA	A. Aceti
CHECKED BY / VERIFICATO DA	E. Barattin
APPROVED BY / APPROVATO DA	D. Serafini

FILE NAME / NOME FILE: MIL07-DBA-ZZ-ZZ-DR-S-20008.P01

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